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TYPHUS AND ALLIED FEVERS.

BOYD (J. S. K.). **Fevers of the Typhus Group in India. An Analysis of One Hundred and Ten Cases reported in 1934.**—*Jl. Roy. Army Med. Corps.* 1935. Nov. & Dec. Vol. 65. Nos. 5 & 6. pp. 289–305; 361–367. [14 refs.]

This important paper is a result of the recent issue to all laboratories in India of standardized emulsions of *Proteus O* antigens.

Since the beginning of the year 1934 detailed records of all cases of fevers of the typhus group have been submitted to Headquarters and have there been analysed.

In 1934, 110 cases of fever were reported; in all these cases blood culture was negative for bacteria of the enteric group. It is also interesting to record that although careful investigations were made no strains of *Proteus* could be isolated either from the blood or urine of any of these patients. As regards the results of the Weil-Felix reaction a titre of 1/100 or over was taken as positive, and of 108 cases fully investigated

43 cases showed preponderance of *XK* agglutinins.
14 „ „ „ „ *X2* „
51 „ „ „ „ *X19* „

Tables are given showing the distribution of the cases by Commands and Districts, seasonal incidence and results of the Weil-Felix reaction. The cases have been placed in three categories or groups in accordance with the results of the agglutination reactions and the clinical evidence. Thirty-five cases in which *XK* agglutinins predominated are grouped together and it is notable that in these cases the reaction for *XK* was clear and definite and there were practically no coagglutinins for *Proteus X2* or *X19*. The majority of these cases occurred in August and September just after the monsoon; this was true whether the cases occurred in the Northern, Southern, or Eastern Commands. As regards the clinical features of the cases in this group they were typical of typhus group fevers but the rash was not well marked and was evanescent and indeed not detected at all in many of the cases, and in distribution was confined to the trunk only.

Fourteen cases in which *X2* agglutinins predominated were investigated; these cases were limited to the Deccan and the Poona district and occurred during November and December. The rash in these cases

was a prominent feature, resembling the rash in boutonneuse fever, and consisted of macules, papules and petechiae; the distribution was general and included the face and palms and soles; although *X2* was the predominant agglutinin in this group co-agglutinins for *XK* and *X19* were also present, and the reaction was in the nature of a group reaction rather than a main agglutinin.

The 51 cases in which *X19* agglutinins predominated could be divided into 3 groups: (1) 16 cases from Poona which were clinically identical with the *X2* cases described above; (2) a group of 27 cases from Bangalore which clinically and serologically (*X19* main antigen) resembled endemic typhus; (3) 8 other cases scattered about the country, some of which resembled the *X2* type, some the *X19*, and some neither. In none of these 110 cases was it possible to incriminate any insect vector, and the author deprecates the use of the diagnosis "Indian tick typhus," a name he says which has given rise to confusion and so far is without any direct scientific proof to support it.

	XK	*X2*	*X19*	
			Poona	Bangalore
Geographical Distribution	Northern, Southern & Eastern Commands	Deccan & Poona District only	Deccan District & Poona	Southern Command except Poona
Seasonal Incidence	Maximum Aug. & Sept.	Maximum Dec.	Maximum Dec.	All year round except Feb.–Apr.
Rash—	Br. Ind.	Br. Ind.	Br. Ind.	Br. Ind.
No. of cases*	15/21 1/14	8/8 5/6	10/10 6/6	5/6 1/21
Day of appearance	5th or 6th	3rd–4th 3rd–10th	3rd 7th	4th–10th 8th
Type ...	Flush + macules	Macules, Papules, Petechial	Macules, Papules, Petechial	Maculo-papular
Distribution	Trunk only	Generalized	Generalized	4 cases trunk only 2 cases trunk and limbs
Duration of rash ...	7 days	Br. Ind. 18·4 14·4	Br. Ind. 25 10·5	Br. Ind. 4 3
Staining ...	Nil	Br. + in some cases	Br. + in some cases	
Duration of Pyrexia ...	14·2 days	12·5 days	15·5 days	10·4 days
Proteus agglutinins ...	*XK*+++ *X2*– *X19*–	*XK*± *X2*+++ *X19*±	*XK*± *X2*± *X19*+ to ++	*XK*± *X2*± *X19*+++

* Numerator = number of rashes, denominator = number of cases.
Br. = British. Ind. = Indian.

Summary.—(1) A definite *XK* group is described corresponding closely to Malayan scrub typhus; (2) It is suggested that there are also 2 other types of typhus in India, one having as its main antigen an unknown strain of *Proteus* and resembling Rocky Mountain fever, and the other with *X19* as its main antigen and resembling endemic typhus. *D. Harvey.*

COVELL (G.). **Studies on Typhus in the Simla Hills. Part I. Introduction. Part II. The Weil-Felix Reaction in Wild Rats. Part III. A Strain of Typhus recovered from Wild Rats.**—*Indian Jl. Med. Res.* 1936. Jan. Vol. 23. No. 3. pp. 701–708. [67 refs.]; 709–712; 713–720. With 2 figs. on 1 plate.

I. The introduction of this paper consists of an interesting historical account of the typhus group of fevers in general and of typhus fevers in India in particular.

The author emphasizes the fact that there are two distinct types of the typhus group of fevers in Kasauli, one type, the sera of which agglutinate *Proteus OXK*, occurs during and after the rains, August, September, October, the other type, the sera of which agglutinate *Proteus OX19*, occurs in the winter and in the early spring. [See this *Bulletin*, 1935, Vol. 32, p. 572.]

II. Taking 1/50 as a standard positive reaction for *Proteus OX19* and 1/125 as standard for *Proteus OXK*, 22 rats or 4·2 per cent. out of 500 examined gave a positive reaction.

It is interesting to note that if the rate is calculated by areas the ratio of rats giving a positive reaction in areas where cases of typhus had occurred is nearly double the rate in rats captured elsewhere.

III. Emulsions were made of the brains of rats and inoculated intraperitoneally into guineapigs and intraocularly into rabbits. It was not possible to isolate a virus by this latter method but in 2 out of 5 rabbits a positive Weil-Felix reaction was obtained. In 2 out of 30 guineapigs inoculated fever resulted and in one was accompanied by scrotal reaction. This infection has now been passaged for 10 generations and in each instance has resulted in fever after an incubation period of 4 to 10 days and in the case of male guineapigs accompanied by scrotal reaction in 63 per cent.

Rickettsia could be readily demonstrated in smear preparations made from the tunica of guineapigs and also from white rats.

Thirteen white rats, 7 rabbits and 2 monkeys gave positive Weil-Felix reactions for *Proteus OX19* and one rabbit gave a positive reaction for *Proteus OXK*. The 3 rats from which this virus was actually isolated gave the following Weil-Felix reactions.

	OX19	*OXK*
Rat 397	100	45
,, 399	50	250
,, 402	100	70

The virus was therefore probably mixed from the 2 varieties. Although it has not yet been possible to test the immunity of the animals infected with this virus against a known virus of typhus there can be little doubt that a typhus virus has been isolated from rats in India. *D. H.*

SHORTT (H. E.) & D'SILVA (H. A. H.). **The Distribution of Indian Tick Typhus with Notes on Laboratory Findings.**—*Indian Med. Gaz.* 1936. Jan. Vol. 71. No. 1. pp. 13–21. With 1 map & 6 charts. [32 refs.]

The author gives a table of 117 cases of the typhus-like fevers which have been recorded in India in recent years, these cases are not confined to any one area but occurred all over the country. The general inference is that these cases occur in the summer in the hills and the winter in the plains [but COVELL has pointed out that in Kasauli one type of typhus occurs during and just after the rains, August, September, October, and another type occurs in the winter and early spring].

Four cases of typhus fever, *OXK* type, vector unknown, were investigated by the authors ; unfortunately none of the 4 cases came under investigation until in the late stages of the fever. Blood was taken from these patients and inoculated into experimental animals—guineapigs, rats and rabbits ; 120 animals in all were employed.

It was not possible to isolate a typhus virus from any of the animals, but of 28 guineapigs 2 developed fever and 6 out of 8 rats after a definite incubation period, the infection, however, could not be passed on to other animals nor was it possible to test for immunity to a typhus virus. Of 3 rabbits inoculated one showed a rising and falling titre of agglutination for *Proteus OXK*.

It has been suggested that the grey palm squirrel, a recent arrival in the hills, may be the reservoir of a typhus virus. Sixty-five of these animals were captured locally and their sera tested ; 55 per cent. gave a positive reaction of 1/25 or higher for *OXK* whereas only 20 per cent. of squirrels captured in the plains gave a positive reaction. An examination of these squirrels showed that the hill squirrels were harbouring fleas and the plain squirrels lice. *D. H.*

O'CONNOR (M. P.). **Typhus Fever with Special Reference to its Occurrence in Malaya.**—*Malayan Med. Jl.* 1935. June & Sept. Vol. 10. Nos. 2 & 3. pp. 25–38 ; 78–99. With 6 figs., 1 map & 8 charts. [107 refs.]

This able paper is divided into 2 sections ; the first dealing with the historical aspect of typhus fevers generally and with typhus fevers in Malaya in particular. There is nothing special to note in this section except that the author emphasizes again the close relationship, as regards epidemiology and serology, between scrub typhus and Japanese River fever ; indeed his conclusion is that Japanese River fever in Malaya is scrub typhus *plus* the primary sore [would it not be more correct to say that scrub typhus is Japanese River fever *minus* the primary sore ?]. As the author states, most of the publications dealing with these fevers in Malaya have hitherto been concerned with the laboratory side and the clinical side has been neglected. The second section of the present paper contains a very full and detailed clinical description of 86 cases of scrub typhus which came under the care of the author in the General Hospital of Kuala Lipis in Central Malaya. Most of these cases occurred among people who were employed in clearing overgrown rubber plantations or pruning the palms and also among people, mostly Chinese, engaged in working over abandoned surface mines ; all are occupations which caused disturbance of rats and their ectoparasites. Twenty-one cases occurred

in 1932, 21 in 1933 and 44 in 1934. Of the 86 cases 33 were Tamils, 28 Chinese, 19 Indians, 1 Malay, 5 Europeans, but the main factor was occupational. The death rate in this series was 4·7 per cent.

As regards the incubation period this could be definitely determined in one case at least as 13 days but was generally determined as from 10 to 21 days. The onset was usually abrupt and the general fever curve differed from that of true typhus in that there were daily remissions and in some cases actual intermissions of the fever. The duration of the fever varied from 10 to 20 days. The rash appeared on the 5th or 6th day and was difficult to see in natives and as a rule was ill defined, appearing first on the back and chest, in no case did it involve the palms or soles. Headache and sleeplessness were constant symptoms, the pulse was slow in relation to the fever, cough was usually present and mild delirium in some cases. Recovery was rapid after the fever ceased.

The differential diagnosis is discussed. Typhoid fever presents difficulties but blood culture should help and there are differences in the rashes; also the common appearance of enlarged glands in scrub typhus (62 per cent. of this series) is a differential point, as is also the increased rate of respiration which was present in all cases of the series.

The Weil-Felix reaction is of course a great help in diagnosis but is not so useful in scrub typhus as it is in true typhus owing to the fact that it does not as a rule appear until the fever has ceased, whereas the chief difficulty of diagnosis arises in the early days of the fever.

As regards the Weil-Felix reaction in the present series all but 2 gave a positive reaction with *Proteus XK*.

38 cases were positive in	1/200	to	1/500
21 ,, ,,	1/500	,,	1/1,000
18 ,, ,,	1/1,000 and over		

One case gave a positive reaction up to a dilution of 1/28,000.

The maximum titre was obtained as a rule on the 17th day of the illness. Certain typical cases are selected and full notes are given with temperature charts, etc.

Prophylaxis lies in vaccination of those exposed and intensive destruction of rats. Treatment is purely symptomatic.

[The reviewer is pleased to note that on pp. 25 and 38 of the *Malayan Medical Journal* of June 1935 several sentences from the critical review published in the *Bulletin* (1933, Vol. 30, p. 343) are quoted but regrets that no mention is made of this review in the otherwise ample bibliography at the end of the article.] *D. H.*

Wolff (J. W.) & Kouwenaar (W.). Onderzoekingen over Sumatraansche Rickettsiosen. [**On Rickettsia Diseases in Sumatra.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1936. Feb. 4. Vol. 76. No. 5. pp. 272–288. With 5 graphs. [20 refs.] English summary.

An epidemiological survey of the occurrence of Sumatran mite fever (tsutsugamushi disease), scrub typhus, and shop typhus (endemic typhus) on the East Coast of Sumatra. From 1930 to 1934 the first two diseases occurred frequently among the labour population of different plantations in areas where uncultivated strips of land had to be cleaned. In these areas cases of mite fever and scrub typhus were

diagnosed amongst the same population groups showing a similar epidemiology the only difference being the occurrence or absence of a primary sore. The viruses of these two diseases have already been shown to be identical in their action on animals. On the other hand, in some areas in several instances many cases of scrub typhus were seen without accompanying cases of mite fever, an observation which may be accounted for by a difference in the vector.

Cases of shop typhus were fewer in number but occurred now and then in epidemic form on some plantations and in villages and towns. The virus of this disease is quite distinct from that of mite fever and scrub typhus and there is no epidemiological correlation. *D. H.*

Union of South Africa. Annual Report of the Department of Public Health for Year ended 30th June, 1935 [Thornton (E. N.), Secretary]. [**Typhus Fever** pp. 41–44.]

Previous to 1923 there was a series of epidemic years for typhus in the Union, over 10,000 cases being reported in one year; by 1927 the number of cases had fallen to 900 but gradually increased again until in 1935 there were 7,000 cases reported. This increased incidence is probably due to the immune population remaining after the epidemic years being replaced by a non-immune population of young adults. The problem here is almost entirely one of louse-borne typhus among a native population living in crowded, insanitary and poorly nourished conditions. The Health Department can at present deal only with outbreaks as they occur by isolation, quarantine and lousing. *D. H.*

Pietermaritzburg, City and Borough of: Annual Report of the Medical Officer of Health for Twelve Months 1st July 1934 to 30th June, 1935 [Anning (C. C. P.)]. [**Typhus Fever** pp. 14–15.]

The Medical Officer of Health, Pietermaritzburg, states in his Annual Report that 9 cases of typhus fever among Borough residents were notified, part due to increased prevalence up-country, for there is a constant movement of natives from without in places where the disease is endemic into the town. Three were definitely imported cases as they were taken ill 2 days after arrival. The remaining six comprised 4 Europeans (3 males, 1 female), one Indian male and one native female. The last had been visiting an area where louse-borne typhus was occurring a week or two before. In the cases of the other 5 there was considerable evidence in favour of the infection being flea-borne. This, if a fact, will increase the difficulties of preventive work. [Nothing is said as to any of these cases ending fatally, but in the tabled return of deaths there is mention of two deaths of non-resident natives due to typhus fever.] *H. H. S.*

Bohls (S. W.). **Typhus Fever in Texas.**—*Southern Med. Jl.* 1935. Dec. Vol. 28. No. 12. pp. 1162–1165. With 1 fig. [15 refs.]

An historical, epidemiological and serological discussion of the disease in the state of Texas. In 1922, 5 cases were reported, in 1934, 417.

D. H.

Lewis (Seaborn J.). **Endemic Typhus Fever in South-east Texas.**—*Southern Med. Jl.* 1935. Dec. Vol. 28. No. 12. pp. 1150–1153. [16 refs.]

The first case of endemic typhus was recorded in New Orleans in 1929 and since then many more cases have been diagnosed, 40 in 1933. The Weil-Felix reaction which is a routine in the Hospital was positive for *Proteus X19* in all cases.

The author emphasizes the point that the skin manifestations in the cases that came under his observation have been, with few exceptions, insignificant and easily overlooked. In many no rash was ever detected by the physician in charge. As the author states, this point has not been sufficiently stressed in the literature and many cases of endemic typhus have been missed, as the physician has been taught to expect a profuse general typhus rash.

For prevention the author urges intensive rat campaigns; such campaigns in Texas have been followed by a marked drop in the number of the cases. *D. H.*

Pergher (J.) & Casier (J.). Le typhus exanthématique au Ruanda-Urundi. [**Typhus Fever in the Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. Sept. 30. Vol. 15. No. 3. pp. 305–347. With 9 figs. & 1 map.

Towards the end of 1933 there was a sudden outbreak of a febrile disease in the district of Urundi, Belgian Congo, which was at first diagnosed as "infectious influenza." As the number of cases increased and many were fatal a fuller investigation was made and it was found that the disease was true epidemic louse-borne typhus. That the cases were true typhus was proved by the fact that the Weil-Felix reaction was positive in high titre with *Proteus X19*, also lice taken from patients and emulsified and injected into guineapigs produced a typical fever in these animals without any scrotal reaction. Clean lice fed on cases of fever were proved to be infective after a suitable incubation period. There were several thousand cases and the mortality rate at one period was 16·4 per cent.

As soon as it was realized that typhus fever existed isolation hospitals were established on suitable sites and all cases of fever were at once brought to these places; on arrival all clothing was removed and disinfected, the patients were bathed and shaved and clothed in hospital garments. Contacts also were segregated and dealt with in a similar manner; at the same time rigid quarantine was set up around the infected areas and the inhabitants were prevented from travelling out of such areas. Under this system the epidemic receded rapidly and within a short time no further cases were reported.

The authors are of opinion that the disease is not endemic in the Congo and that infection was introduced from without, possibly from Uganda. *D. H.*

Giroud (P.). Enquête sur les rats des foyers typhiques du bled et d'une antique cité de l'intérieur de la Tunisie où le typhus sévit. [**Examination of the Rats of Typhus Centres of the Country and an Ancient Town in the Interior of Tunis.**]—*Bull. Soc. Path. Exot.* 1935. Dec. 11. Vol. 28. No. 10. pp. 897–899.

Louse-borne typhus was prevalent in the town and country at the time of this investigation. Two-hundred-and-thirty-four rats were

captured and examined but it was not possible to isolate a typhus virus from any one of these, in marked contrast to the city of Tunis, where a murine typhus virus can be readily obtained from the rats near the docks and quays. The conclusion is that where louse-borne typhus is concerned man is the reservoir of the virus and not the rat. [See this *Bulletin*, 1935, Vol. 32, p. 558.] *D. H.*

NIGG (Clara). **On the Presence of Typhus Virus in Wild Rats in New York City.**—*Jl. Infect. Dis.* 1935. Nov.–Dec. Vol. 57. No. 3. pp. 252–254. [27 refs.]

Fifty-one wild rats were captured in the Metropolitan area of the city of New York, most of them from the neighbourhood of the wharves. The sera of 16 of these rats gave weak positive Weil-Felix reactions. The brains of these 16 rats were emulsified and injected into guineapigs, 2 for each rat brain. None of the 32 guineapigs showed any fever and no virus could be isolated, but 5 of the guineapigs when tested later showed some degree of immunity to a known typhus virus. *D. H.*

DA FONSECA (Flavio). Notas de acareologia. X. Occorrencia, em S. Paulo, de acarianos transmissores de varias modalidades de febre exanthematica e suas possiveis relações com a Rickettsiose neotropica paulista. [**Species of Ticks and Mites which may be Transmitters of the S. Paulo Typhus Virus.**]—*Mem. Inst. Butantan.* 1935. Vol. 9. pp. 27–41. [28 refs.] English summary.

The following have been found in the districts where S. Paulo typhus is endemic: *Amblyomma cajennense, A. ovale, A. striatum, R. sanguineus, B. microplus* and *H. leporis-palustris* among the Ixodidae; *Liponyssus bacoti* and other species and several of the Trombidiidae.

On both epidemiological and experimental grounds transmission by a tick was most probable, especially *A. cajennense*, since it is readily infectible and attacks rodents and human beings. The other two species of Amblyomma mentioned are common on dogs in the rural districts of S. Paulo, while *R. sanguineus* is under suspicion since it can transmit endemic typhus elsewhere as on the Mediterranean littoral—*—fièvre boutonneuse. H. leporis-palustris* is commonly found on hares and can carry Rocky Mountain fever virus. Epidemiologically there is evidence that the mites may transmit infection but this needs further investigation. *H. H. S.*

LEWTHWAITE (R.) & SAVOOR (S. R.). **The Typhus Group of Diseases in Malaya.—Part I: The Study of the Virus of Rural Typhus in Laboratory Animals. Part II: The Study of the Virus of Tsutsugamushi Disease in Laboratory Animals. Part III: The Study of the Virus of the Urban Typhus in Laboratory Animals.**—*Brit. Jl. Experim. Path.* 1936. Feb. Vol. 17. No. 1. pp. 1–22. With 6 charts & 14 figs. (4 coloured) on 3 plates. [13 refs.]; pp. 23–34. With 2 charts & 7 figs. (3 coloured) on 2 plates. [10 refs.]

I. The authors refer to the difficulty experienced in establishing a strain of the virus of rural typhus (scrub typhus) in guineapigs. Previous workers have found that the intraperitoneal injection of blood taken from cases of the disease has occasionally produced fever in guineapigs but it has not been possible to passage the virus in series. The authors using guineapigs fed on a diet deficient in vitamins

succeeded in two instances in infecting guineapigs and after considerable difficulty in the first few passages established the virus and it is now in its 100th generation. Guineapigs can now be easily infected either by the intraperitoneal or subcutaneous route; special precautions as regards the diet of the animals is no longer necessary. The infection in the guineapig produces a fever of variable duration but in none of the infected male guineapigs was any scrotal reaction noted. Enlargement of the spleen and ascites were constant post-mortem features and in the fibrinous exudate on the spleen typical Rickettsia were readily demonstrated and are beautifully shown in the plates, which should be studied. When the virus was fully established in guineapigs a mortality of 90 per cent. occurred in the infected animals. [In Japan it has been found that the virus of tsutsugamushi fever produces only a mild illness in guineapigs, whereas the virus of Sumatran mite fever produces a severe and often fatal infection.] The lesions in the guineapig brain were meagre but typhus nodes could be found after careful search; also mononuclear perivascular collections were noted in the mesentery of the guineapig. Inoculation (intraperitoneal) of the virus into rabbits produced no symptoms of illness but a positive Weil-Felix reaction for *Proteus OXK* was detected. The route of choice for inoculation of rabbits is the intraocular according to the technique employed by Nagayo in Japan. Blood from 12 patients was inoculated into the eyes of rabbits and no less than 4 strains of virus were obtained by this means; infection was also readily obtained by the same route when emulsion of the brain of infected guineapigs was utilized. The local reaction in the rabbit's eye was similar to that described by Japanese workers with the virus of tsutsugamushi fever, that is an iridocyclitis. The rabbits did not have any fever and there were no general effects; after recovery from the local lesion immunity to the virus followed and persisted for at least one month. Rickettsia were demonstrated in the cells of Descemet's membrane and were similar to those seen in smears from the spleen of infected guineapigs and also to those described in the eye of rabbits infected with the virus of tsutsugamushi disease in Japan.

As regards the Weil-Felix reaction in infected rabbits the results were as follows: 29 rabbits infected by the intraperitoneal route, 18 positive for *Proteus OXK*, all negative for *Proteus OX19*; 26 rabbits (intraocular), 12 positive for *Proteus OXK* with a rising and falling titre, all negative for *Proteus OX19*.

Six rabbits were inoculated intradermally with emulsion of brain of infected guineapigs; a macular reaction occurred at the sites of injection in all and in four instances a definite small necrotic ulcer developed (tache noire).

Rats.—It has been found that wild rats as experimental animals in rural typhus research have been unsatisfactory for several reasons, but the authors have discovered that white rats can be readily infected with the virus which they have isolated and this virus can be indefinitely passaged in these animals (evidence that the virus is a murine variety and that the rat is a reservoir). The infected white rats had little or no fever and showed no scrotal reaction; infection had to be determined by employing guineapigs as "indicators"; also rabbits inoculated from infected white rats developed agglutinins for *Proteus OXK*; and Rickettsia could be demonstrated, but sparsely, in smears from the tunica vaginalis of these white rats. Incidentally no scrotal swelling was noted in any of the guineapigs infected from the white rats.

Monkeys.—Four monkeys injected intradermally with the rural typhus virus developed fever and a local reaction—a small ulcer with necrotic centre at the site of inoculation ; in 3 out of the 4 a bubo was also detected. All monkeys showed a leucopenia and the Weil-Felix reaction was positive for *Proteus OXK* in all 4, but the serum of one gibbon also agglutinated *Proteus OX19*. This gibbon strain of virus was subinoculated into rabbits and the sera of these animals soon lost the agglutinin for *Proteus OX19* and later only agglutinated *Proteus OXK*.

II. A strain of the local Malayan virus of tsutsugamushi fever obtained from a case of the disease was also studied. Tsutsugamushi fever in Malaya differs from rural typhus only in that a primary sore occurs in the former disease. This virus has not yet been established in guineapigs although these animals have been infected by the intraperitoneal route and the post-mortem findings are identical with those in animals infected with the rural typhus virus described above. The tsutsugamushi virus can be readily inoculated into the eye of a rabbit and produces exactly the same effects as does the rural typhus virus, and identical Rickettsia can be demonstrated in the cells of Descemet's membrane ; the sera of these infected rabbits agglutinated *Proteus OXK* and not *Proteus OX19*.

Intradermal inoculation of this tsutsugamushi virus in monkeys and rabbits produces the typical primary sore and in monkeys a leucopenia was noted and agglutinins for *Proteus OXK* were produced.

III. Guineapigs can be easily infected with the virus of urban typhus and it can be readily passaged in these animals ; fever is invariably produced and 95 of the infected male guineapigs showed a very marked scrotal reaction which disappeared as the fever ceased. The mortality in the guineapigs with this virus was less than 1 per cent. The virus of urban typhus does not protect guineapigs against the virus of scrub typhus or tsutsugamushi fever nor *vice versa*. On post-mortem examination of infected guineapigs enlarged spleen was noted and marked changes in the tunica vaginalis (fully described in the text) ; but there was no ascites in contrast to the condition noted in guineapigs infected with rural typhus virus.

Rickettsia were readily found in smears from the tunica. The Rickettsia found in urban typhus resemble those found in rural typhus in that they infect the same type of cell, their intracellular distribution is the same and the staining by Giesma method is alike, but they differ from one another in length, width and numbers. In rural typhus the form is coccoid and diplococcoid and resembles *R. orientalis* in films ; in urban typhus the form is rod-like, they are fine delicate bacilli and resemble *R. prowazeki*. Intraocular injection of the virus of urban typhus produced a reaction in the eyes of rabbits but much less marked than that produced by the virus of rural typhus and it was not possible to passage the virus beyond the 3rd generation.

Fifty-eight rabbits were inoculated with the virus and of these 30 gave a positive Weil-Felix reaction for *Proteus OX19*, and a negative reaction for *Proteus OXK*.

Both rabbits and monkeys were injected intradermally with the virus but in none did a local sore develop at the site of injection, the serum of infected monkeys agglutinated *Proteus OX19* and there was no leucopenia in their blood, in marked contrast to the effects of injection of the viruses of rural typhus and tsutsugamushi fever. *D. H.*

Kligler (I. J.), Aschner (M.) & Levine (Sonia). **Comparative Studies of the Louse-borne (Epidemic) and Flea-borne (Murine) Typhus Viruses.**—*Brit. Jl. Experim. Path.* 1936. Feb. Vol. 17. No. 1. pp. 53–60. [11 refs.]

The authors give an historical review of work done on the various typhus viruses and point out the striking differences in pathogenicity of the louse-borne and flea-borne viruses for guineapigs and rats. The flea-borne virus can be readily passaged in rats and mice and after 30 brain passages the properties of this virus remain constant notably the production of a scrotal reaction in guineapigs.

The louse-borne virus cannot be passaged in rats or mice and rarely if ever produces scrotal reaction in guineapigs. The authors studied the question first by infecting animals with the two viruses and later testing for immunity.

Fifty-seven animals were infected with the flea-borne rat virus and 17 were infected with the louse-borne or human virus; when tested later the animals were found to be immune both to the homologous and heterologous virus. But when formolized vaccines prepared from tissue cultures were employed for immunization a striking difference from the above results was noted; solid immunity was produced to the homologous virus but only partial immunity to the heterologous.

The authors consider that the two viruses differ both antigenically and biologically and they agree with Nicolle that though probably having a common origin the two types are at present distinct. *D. H.*

Laigret (J.) & Durand (R.). Technique de la dessication et de l'enrobage du virus typhique murin. [**Mode of drying and coating the Virus of Murine Typhus.**]—*Arch. Inst. Pasteur de Tunis.* 1936. Jan. Vol. 25. No. 1. pp. 82–88.

The brain of an infected rat or guineapig is made into a paste with phosphate of soda and dried over chloride of calcium *in vacuo*; the drying is completed in 3 hours and the dried brain is then pulverized. Various tests were made and it was found that the murine typhus virus stands desiccation well and the virulence is not altered in any way. The yolk of egg is added drop by drop to the pulverized brain, 4 cc. of yolk to 1 gram of powder, and then dried again; retained at a temperature of −10°C. this virus is active up to 15 days and *in vacuo* up to 12 days. The virus was also enveloped in oil only and was active up to 15 days. In actual practice the powdered virus in yolk of egg is taken to the place where the inoculations are to be carried out and the oil is added on the spot. *D. H.*

Regendanz (P.) & Muniz (Julio). Pesquisas sobre a transmissão do typho exanthematico de S. Paulo por ixodideos. [**Transmission of the Virus of S. Paulo Typhus by Ticks.**]—*Brasil-Medico.* 1936. Jan. 18. Vol. 50. No. 3. pp. 45–48.

Guineapigs were the animals used in this investigation to determine the transmissibility of S. Paulo virus by *Rhipicephalus sanguineus*. It is shown that nymphs developing from larvae which had fed on infected animals are themselves infective and can transmit the virus to other animals, and further that these ticks, infected in the larval stage, retain the infection as adults. In other words infection is retained and transmissible through all the stages of the tick's life, and it remains to be

proved whether the virus can pass to the ovum and so to a new generation. It is true that ticks are not often found on typhus patients, but, as the authors state, the larvae engorge themselves in 2–3 days and the nymphs in 1–2 days, their bite is so slight that it may pass unperceived and they drop off when engorged, and hence are not present by the time symptoms appear. *H. H. S.*

Monteiro (J. Lemos). Tentativas de transmissão experimental do "typho exanthematico" de S. Paulo por percevejos (*Cimex lectularius*). [**Attempts to transmit the S. Paulo Virus by Bed-Bugs.**] —*Mem. Inst. Butantan.* 1935. Vol. 9. pp. 1–24. With 10 graphs. English summary.

Series of experiments were carried out (1) with adult *Cimex lectularius* collected in a house in Pinheiros; (2) with laboratory reared larvae; (3) with laboratory reared adults. As a result it was found that the virus is soon reduced and lost in the bed-bug. If the insect was fed on an infected guineapig during the febrile stage it was infective for a few, not more than 24, hours. Further tests carried out at intervals from 2–25 days were all negative, by bite or by faecal inoculation. *H. H. S.*

Muniz (Julio) & Regendanz (P.). Cultivo do virus do typho exanthematico em S. Paulo. [**Cultivation of the Virus of S. Paulo Typhus.**]—*Brasil-Medico.* 1936. Jan. 11. Vol. 50. No. 2. pp. 23–24. With 1 fig.

The technique employed was that of Li and Rivers for cultivating vaccinia virus. This consisted in obtaining chicken embryos, 6–7 days old, washing in Ringer's solution and placing in a Petri dish with 2 cc. of Tyrode's solution of pH 7·7. After dividing the tissue as finely as possible, 0·1–0·2 cc. of the emulsion was placed in Erlenmeyer flasks each containing 5 cc. of Tyrode's solution, and the material for seeding was the triturated spleen (in Tyrode solution) of a guineapig killed on the second day of fever after infection with the virus. Cultivation was carried on for 5 days at 37°C., after which 1–2 cc. were injected intraperitoneally in guineapigs, test being made of the same culture for bacterial sterility. The animals presented the characteristic course of temperature, and died on the 8th or 9th day after inoculation. Rickettsia were found in scrapings from the peritoneum in about half the animals (a higher percentage than is found by direct inoculation of infected blood). Rickettsia were not found on examination of the cultures themselves—smears of the fluid medium or of the embryo tissue. *H. H. S.*

da Cunha (A. M.). Cultura da "Rickettsia" do typho exanthematico de S. Paulo na membrana chorioallantoide de embryão de gallinha. [**Cultivation of Rickettsia of S. Paulo Typhus in Chicken Embryonic Membrane.**]—*Brasil-Medico.* 1936. Feb. 15. Vol. 50. No. 7. pp. 133–134. With 2 figs.

The authors inoculated the chorio-allantoic membrane of 7–10 day embryo chicks with a fragment of spleen from an infected guineapig. The eggs were then maintained at 40°C. and examination carried out 3–5 days later of the membrane in contact with the spleen fragment. In the case of 3 of four eggs so inoculated Rickettsia were seen by

section and staining on the third day and in the fourth examined on the 5th day they were more numerous. Further inoculation of guinea-pigs with fragments of the membrane triturated in saline set up the disease. *H. H. S.*

Reitano (Ugo). Recherche du virus exanthématique murin à Rome. [**Search for the Murine Typhus Virus in Rome.**]—*Boll. Sezione Ital. Soc. Internaz. di Microbiologia.* Milan. 1935. Oct. Vol. 7. No. 10. pp. 377–383.

It is well known that boutonneuse fever occurs in Rome but so far no cases of endemic typhus have been reported in that city.

Two-hundred-and-twenty-five rats were captured during the years 1932 to 1935 at various seasons of the year and in different localities in the city including over 100 rats from the landing stages on the river.

The rats were killed and emulsions of the brains inoculated into guineapigs but no typhus virus could be isolated. As the author says although this does not exclude the occurrence of typhus virus in the rats of the city it at least means that it is rare. *D. H.*

Bruynoghe (R.) & Jadin (J.). Culture du virus typhique murin sur la membrane chorio-allantoidienne de l'embryon de poulet. [**Culture of Murine Typhus Virus on Chick Embryo Membranes.**]—*C. R. Soc. Biol.* 1936. Vol. 121. No. 2. pp. 153–155.

The authors repeated the work of Zia and da Cunha and succeeded in cultivating their Antwerp typhus virus on chick embryo membrane using the method of Goodpasture.

The virus was also passaged from embryo to embryo for several generations and was proved to be virulent at each stage by inoculation into guineapigs. *D. H.*

Blanc (Georges) & Martin (L. A.). Conservation du virus du typhus murin, à basse température. [**Preservation of Typhus Virus at Low Temperatures.**]—*C. R. Soc. Biol.* 1935. Vol. 119. No. 27. pp. 1322–1323.

The authors find that if the carcases of infected guineapigs are maintained in the frigidaire at a temperature of −18°–20°C. the virus of rat typhus of Casablanca can be isolated from the brain of these animals up to 45 days ; but if rats are kept under the same conditions the virus is still viable up to 169 days. *D. H.*

Zinsser (Hans), Castaneda (M. R.) & Hager (F. D.). **Protective Action of Concentrated Anti-typhus Serum (Murine Type) against European Typhus Virus.**—*Proc. Soc. Experim. Biol. & Med.* 1935. Oct. Vol. 33. No. 1. pp. 44–47. With 1 fig.

Previous trials had shown that antityphus horse serum (murine type) protected animals completely against the homologous virus but only slightly against a European typhus virus (human type).

This same serum was concentrated and it was found that the Weil-Felix reaction of the concentrate was much increased and the concentrated serum protected animals against the European virus as well as it did against the Mexican murine virus. *D. H.*

Giroud (Paul). Mise en évidence, dans le sang circulant, de virus typhique après la période d'évolution apparente de l'infection expérimentale. [**Demonstration of the Virus of Typhus from the Blood of Experimental Animals Some Time after the Fever has ceased.**]—*C. R. Soc. Biol.* 1935. Vol. 120. No. 40. pp. 1193–1194.

The author has found that the best method for obtaining the virus from cases of typhus is to take 10 cc. of blood from a vein, allow the blood to clot, remove the serum, then break up the clot and inject it intraperitoneally into guineapigs. Employing the same method in guineapigs the author was able to isolate the virus readily from animals that had had inapparent infections some 30 days before. *D. H.*

Lépine (P.) & Sautter (V.). Sur la durée de conservation du typhus murin dans l'encéphale du spermophile. [**Duration of the Virus of Murine Typhus in the Brain of the Spermophile.**]—*Bull. Soc. Path. Exot.* 1936. Jan. 8. Vol. 29. No. 1. pp. 13–16.

The authors have previously pointed out that the Macedonian spermophile (*Citillus citillus*) the ground squirrel, is susceptible to typhus virus.

Strains of murine virus have been passaged for one year through these animals without producing any change in the virus. Two animals were inoculated in each series ; one of these was killed during the fever for passage of the virus and the others kept for varying periods to determine the longevity of the virus in the brain. Up to the 118th day after the fever the virus was isolated from all animals tested and up to the 226th day many, though not all, were still positive ; one or two were still positive up to the 374th day. Even after this long duration in the brain the virus gave the same reactions when inoculated into guineapigs.

D. H.

Noury (M.). Présence des virus typhiques dans la moelle épinière. Essais d'atténuation de ces virus par dessication. [**Presence of Typhus Virus in the Spinal Cord of the Guineapig. Attempts to attenuate it by Drying.**]—*Bull. Soc. Path. Exot.* 1935. Dec. 11. Vol. 28. No. 10. pp. 906–909.

Two strains of virus were used in these experiments, one a murine virus isolated in Casablanca the other a classical typhus virus from Tunis.

Guineapigs were inoculated and killed during the fever and the cord removed, washed and sectioned ; small portions of the cord were emulsified and inoculated into other guineapigs and these developed typical fever with orchitis in the case of the Casablanca virus. No typhus lesions could be found in sections of the cord, nor could Rickettsia be demonstrated.

The virus can be passaged in guineapigs by this method just as readily as if brain emulsion was employed. Desiccation of the cords for 24 hours apparently destroyed the classical virus, but after 3 days drying the murine virus produced a mild attack of fever in one guineapig, and when tested later this animal was immune. *D. H.*

Darder (Emilio) & Meneu (Antonio). Dos casos de fiebre exantematica mediterranea. [**Two Cases of Boutonneuse Fever.**]—*Medicina Países Cálidos.* Madrid. 1935. Dec. Vol. 8. No. 12. pp. 594–599. With 4 figs. [16 refs.]

The author places these two cases on record because, he states, only one case has previously been reported (in 1933) in the Balearic Islands. The present two were a man and his wife living in Mahón (Minorca), where the former was an official at the Naval Base. The former showed several "button" spots on the abdomen and the latter one marked with a necrotic centre. The course of illness in each case was the usual. The man was taken ill about a fortnight before his wife. He had a bitch with pups and they were overrun with ticks, which also invaded his office table and he often killed them with his hands. His wife washed the dogs to rid them of ticks and also killed many in the same way, and both may have thus become infected. *H. H. S.*

Giroud (P.). Recherche des cas inapparents de typhus dans les foyers du bled et dans une petite ville de l'intérieur de la Tunisie en 1935. [**Research for Cases of Inapparent Typhus in the Regions of the Country around Tunis and in a Small Town.**]—*Bull. Soc. Path. Exot.* 1935. Dec. 11. Vol. 28. No. 10. pp. 899–905.

Out of 113 contacts with typhus fever 5 gave a rising positive Weil-Felix reaction but had no fever or other symptoms of typhus.

The blood of one of these cases was inoculated into guineapigs and they developed fever but when tested later were not immune to typhus virus. Of 27 contacts who gave a negative reaction the virus was isolated from 3; these were cases of inapparent infection. *D. H.*

Curran (E. J.). **Some Observations on Fever of the Typhus Group (Vector Unknown).**—*Jl. Roy. Army Med. Corps.* 1936. Feb. Vol. 66. No. 2. pp. 94–101. With 2 charts.

Ten cases of fever of the typhus group occurred in Jubbulpore in the year 1934 and are described in this paper.

All the cases showed marked constitutional disturbance and indeed resembled clinically the text-book descriptions of true typhus. One case in which symptoms of encephalitis developed ended fatally.

A profuse typhus rash which appeared on or about the 5th day of the fever and spread over the body including the palms and soles and face was noted in all the cases. The pyrexia lasted 15 to 16 days. All the cases gave a positive Weil-Felix reaction; some of the sera agglutinated *Proteus X19* in highest dilution, some *Proteus XK*, and in 2 cases *Proteus X2*.

In none of the cases was there any history of tick or insect bite of any description and an exhaustive search for a possible vector proved futile. The cases were few in number, very scattered and bore little or no relation to one another; although a number of the patients belonged to one regiment these cases occurred in different companies and in different bungalows and at different periods of the year.

[It is obvious that these cases cannot be classified according to the vector neither can they be classified by the Weil-Felix reaction as, although clinically similar, some agglutinated *X2*, some *XK*, and some *X19* in highest dilution.] *D. H.*

CULLEN (Thos.). **Report on a Case of Fever belonging to the Typhus Group.**—*West African Med. Jl.* 1935. Nov. Vol. 8. No. 4. pp. 15–16.

A case of fever which was clinically typical of the typhus group of fevers. The fever lasted 14 days and a morbilliform rash covered the limbs and body and also was noted on the palms and soles and on the face. The following points were noted: (1) rash, (2) the odour, (3) intense headache, (4) duration and character of the fever, (5) negative Widal reaction. It was not possible at the time to carry out the Weil-Felix reaction. *D. H.*

KUYPERS (C. A.). Een tweetal gevallen van Tropical Typhus? [**Two Cases of Tropical Typhus?**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Oct. 29. Vol. 75. No. 22. pp. 1896–1903. With 2 figs. [18 refs.]

These two cases, although the diagnosis continued somewhat doubtful to the end, deserve a record, if only to show how difficult a decision may be. Both showed scrotal lesions, which are regarded as "primary." Case No. 1 was one of sudden commencement, acute illness, high fever with rigors, a somewhat swollen penis and painful enlarged inguinal glands. At first there was no abnormality of scrotum or testicle. Soon there appeared necrotic areas on the prepuce and erosions on the scrotum. These necrotic areas spread over penis and scrotum. Serum tests on the 7th day proved puzzling: typhoid and paratyphoid B negative; *Proteus X19 O* positive with coarse flocculation 1–100, weakly positive 1–600 with fine flocculation; *Proteus XKi.O* lysis 1–600 with clarification, partial lysis and coarse flocculation 1–1,000. By the 12th day all serum tests were completely negative.

After considering all the possibilities the conclusion come to is that this was a patient infected with tropical typhus on the scrotum or penis and that the necroses were due to primary local vascular changes.

In the second case, which was fatal, there was marked jaundice and again a scrotal lesion in the shape of an ulcer on the raphe at the base of the penis. Serum tests gave: typhoid positive 1–2,000, paratyphoids and tropical typhus negative. In spite of these findings and in spite of jaundice, the author considers, on clinical grounds that the case was one of tropical typhus and that the scrotal ulcer was the primary lesion.

W. F. Harvey.

LÉPINE (P.). Sur l'existence, en Indochine, de trois espèces au moins de fièvres exanthématiques. [**Three Varieties of the Typhus Group of Fevers occurring in Indochina.**]—*Bull. Soc. Path. Exot.* 1936. Jan. 8. Vol. 29. No. 1. pp. 16–19. [11 refs.]

The author considers that it has been proved that there are at least 3 types of typhus fever in Indochina:—

1. Historic typhus carried by lice.
2. Endemic typhus carried by the rat flea.
3. Japanese River Fever carried by a mite.

Further research is necessary to determine the relationship between Japanese River fever and similar fevers met with in Malaya, Sumatra and French Indochina. *D. H.*

Meyer (K. F.). **Latent Infections.**—*Jl. Bacteriology.* 1936. Feb. Vol. 31. No. 2. pp. 109–135.

Among other conditions inapparent infections in typhus are discussed; the author prefers the term latent infection. *D. H.*

Massias (Charles). Typhus tropical bénin, typhus endémique à Tra-vinh (Cochinchine).—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Oct. Vol. 13 No. 8. pp. 1040–1045. [19 refs.]

Ragiot (Ch.), Delbove (P.), Nguyen-van-Huong & Ho-thien-Ngan. Fièvre typho-exanthématique avec fièvre typhoïde associée. [**Typhus associated with Typhoid Fever.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. July–Aug. Vol. 13. No. 6. pp. 762–766.

A case of fever with typhus-like rash, swollen face, injected conjunctiva and delirium; the patient died on the 9th day. The *Bact. typhosum* was isolated from the blood, the Widal reaction was positive and the Weil-Felix reaction was negative. Blood taken from the patient during the fever and injected into guineapigs produced fever in these animals and orchitis. When tested later with a true typhus virus these animals were found to be immune. *D. H.*

Lewthwaite (R.). **The Pathology of the Tropical Typhus (Rural Type) of the Federated Malay States.**—*Jl. Path. & Bact.* 1936. Jan. Vol. 42. No. 1. pp. 23–30. With 8 figs. (4 coloured) on 3 plates.

This paper deals with the morbid anatomy of rural typhus in man and the histopathology of the brain in that disease. The description of the gross pathology is based on the findings of 12 autopsies made by the author at the District Hospital in Kuala Lumpur. It may be said that naked eye examination gave no single consistent feature that could be regarded as peculiar to tropical typhus; the few pathological changes noted may all be met with in the morbid anatomy of other tropical diseases.

Morbid histology of the brain.—This examination was made in 7 cases, in 2 no lesions could be detected after prolonged search.

In rural typhus the microscopic findings in the brain are meagre but all the lesions described by previous workers in the brains of human cases of louse-borne typhus could be found in one or other of the brains examined. The lesions in the brain in cases of rural typhus differ only in degree and number from those found in epidemic typhus. The principal lesion consists of a slight perivascular proliferation of neuroglia cells one or two cells in depth along the course of capillaries or arterioles; these vessels also show a slight degree of swelling of the endothelial cells. In a few instances this lesion was well marked and merited the term "typhus node." These lesions are beautifully demonstrated in figures which also show Rickettsia in the cytoplasm of the swollen endothelial cells. *D. H.*

Sparrow (Hélène) & Roussel (Henri). Fréquence remarquable du *Proteus X19* au cours d'une épidémie de typhus. [**Frequent Isolation of *Proteus X19* in an Outbreak of Typhus Fever.**]—*Arch. Inst. Pasteur de Tunis.* 1936. Jan. Vol. 25. No. 1. pp. 58–73. [10 refs.]

Reference is made to previous work on the subject of the isolation of strains of *Proteus X19* from cases of typhus. In some epidemics although cultures were attempted from many cases it has not been possible to isolate Proteus strains from any of the patients; in other epidemics cultures of *Proteus X19* have occasionally been obtained.

In the present research bloods sent to the laboratory for agglutination and Wassermann reactions were used for cultural purposes. The serum was first drawn off and the clot broken up and placed in broth tubes and incubated. Four hundred and one samples of blood were tested as follows:—

	Results *X19*	Per cent.
65 cases of typhus	32	50
48 suspected cases of typhus ...	1	
129 other fevers	11	8·5
124 contacts healthy	0	
35 syphilitics	0	
401	44	11·0

In the 65 cases of fever definitely diagnosed as typhus 44 gave a positive Weil-Felix reaction, and a strain of *Proteus X19* was isolated from 13 of these, and from 21 cases in which the Weil-Felix reaction was not positive (early cases mostly) *Proteus X19* strains were isolated from 19 or practically in every case. Although the bacillus could be most readily isolated from the cases before agglutinins had developed yet in one instance a strain of *Proteus X19* was isolated from the blood of a patient giving a very high titre of agglutination and also from 4 cases of convalescents after fever had ceased.

All the cultures resembled one another biologically: lactose no change, glucose, maltose, and saccharose acid+gas, indole produced and gelatine liquefied; all the strains were agglutinated by specific rabbit serum for *Proteus X19*, and also by the serum of cases of typhus, both in the O and H forms. *D. H.*

Kanarewskaja (A. A.) & Bogomolow (I. L.). Die Agglutinine gegenueber Proteus X19 im Liquor bei Fleckfieber. [**Agglutinins for *Proteus X19* in the Spinal Fluid of Typhus Patients.**]—*Arch. Sci. Biol.* 1935. Vol. 38. No. 2. [In Russian pp. 539–542. German summary p. 543.]

The cerebrospinal fluid was tested for agglutination of *Proteus X19* in 44 patients suffering from typhus fever. In 28 of them there was a positive result in low dilution "50–70 times less than in blood serum." In convalescence the agglutinins usually disappeared, in two only was there a residual agglutination and that in very small degree. It is believed that the agglutinins are not produced locally but have resulted from passage from the blood to the spinal fluid. *H. H. S.*

i. Delville (J. P.). Recherche des bacilles du groupe *Proteus X* chez les animaux inoculés avec les différents virus des typhus. [**Bacilli of the Proteus Group in Animals inoculated with Typhus Viruses.**]—*Arch. Inst. Pasteur de Tunis.* 1936. Jan. Vol. 25. No. 1. pp. 147–148.

ii. ——. Recherche des bacilles du groupe *Proteus X* chez les rats du port et de la ville de Tunis. [**Search for Bacilli of the Proteus Group in the Rats of the Port and Town of Tunis.**]—*Ibid.* pp. 142–146.

i. Cultures were made from the blood, brain and spleen of experimental animals (rats, mice, rabbits, guineapigs, cats and monkeys) infected with typhus virus; 125 animals in all were investigated but from none of the cultures could any bacillus of the Proteus group be isolated.

ii. Two hundred wild rats captured in the port of Tunis were examined in the same way. Three strains of Proteus were isolated but these strains were not agglutinated by specific *Proteus X19* sera or by the sera of typhus cases. However after subculture the strains were eventually agglutinated by *Proteus X19* rabbit serum but still not by sera of cases. The author considers that these strains were in a state of transformation from *Proteus vulgaris* to *Proteus X19*. *D. H.*

Delville (J. P.). Etude comparative de la production des agglutinines anti *OX19* chez le lapin neuf et chez le lapin typhique. [**Agglutinins of *Proteus OX19* in Rabbits inoculated with Proteus and with Typhus Virus.**]—*Arch. Inst. Pasteur de Tunis.* 1936. Jan. Vol. 25. No. 1. pp. 149–153. With 4 figs.

If rabbits are inoculated with typhus virus, agglutinins for *Proteus OX19* appear about the 20th day, whereas if rabbits are inoculated with the bacillus the agglutinins appear about the 5th day after the inoculation. In rabbits which have previously been infected with typhus virus and are subsequently inoculated with killed cultures of *Proteus X19* the agglutinins for this bacillus appear earlier than they do after injection of normal rabbits. *D. H.*

Gaud & Nain. Note sur le parasitisme du chien à Rabat par le *Rhipicephalus sanguineus*. [**Note on Prevalence of Ticks on Dogs in Rabat.**]—*Bull. Soc. Path. Exot.* 1935. Oct. 9. Vol. 28. No. 8. pp. 718–719.

An investigation of the number of *R. sanguineus* on dogs in Rabat was made.

These ticks are very numerous on the dogs during the months April to November and practically disappear during December, January and February.

Cases of boutonneuse fever are most common from May to August when the number of ticks on the dogs is at its peak. *D. H.*

van Loghem (J. J.). Een proteus-X-Kingsbury-stam in statu nascendi. [**A Kingsbury Strain of Proteus in Process of Development.**]—*Nederl. Tijdschr. v. Geneesk.* 1936. Feb. 29. Vol. 80. No. 9. pp. 817–824. With 5 figs. English summary.

More than ten years ago the author isolated a strain of *Proteus* from the faeces of a child in Amsterdam. The strain was indologenic and

designated FK_{12}. Sera from patients with scrub-typhus agglutinate it to a certain degree and this peculiarity is explained by a splitting of the strain in colonial growth, whereby some colonies were composed of non-indologenic organisms which were agglutinated by scrub-typhus sera to the same titre as a genuine Kingsbury strain. The author also showed that the *X* element of *Proteus XK* is not only agglutinated by scrub-typhus serum but is itself an antigenic component. A *Proteus XK*-rabbit serum agglutinated *X* subcultures of the strain FK_{12} but not other subcultures. He hypothecates *X* elements in the mosaic of the O-antigen of all ordinary *Proteus* strains. "*X*-strains are ordinary *Proteus* strains in which *X*-elements are dominating by adaptation or regression." The *X19* element is always connected with production of indol. *H. H. S.*

Scales (C.). **Some Observations on the Weil-Felix Reaction.**—*Jl. Roy. Army Med. Corps.* 1935. Nov. Vol. 65. No. 5. pp. 317–319.

In this investigation concentrated O emulsions of *Proteus X2, X19* and *XK* were employed and the technique followed was exactly the same in each case. During the year 1934 17 cases of fever of the typhus group gave positive Weil-Felix reactions, 2 for *Proteus X2*, 9 for *X19* and 6 for *XK*. The range of titre of agglutination in these cases varied from 1/500 up to 1/100,000 and the maximum titre was usually obtained from the 9th to the 14th day of the disease. When the sera of some of these people was retested 3 to 6 months later none of them gave a positive reaction. The sera of 150 normal people, Indians and British, gave negative results. In 8 cases of enteric fever (blood culture positive) the Weil-Felix reaction was negative ; but in 8 cases of typhus fever there was a definite increase of the inoculation agglutinins for *Bact. paratyphosum B*. *D. H.*

Savoor (Sadashivarao R.), Castaneda (M. Ruiz) & Zinsser (Hans.). **Notes on the Weil-Felix Reaction in Individuals not suffering from Typhus.**—*Proc. Soc. Experim. Biol. & Med.* 1935. Dec. Vol. 33. No. 3. pp. 365–366.

The sera of 600 individuals was tested ; only 4 gave a positive reaction in a dilution of 1/160 and 25 in 1/80.

The sera of persons (25) born in Russia gave on the whole lower reactions than the sera of persons born in America. *D. H.*

Lépine (P.). La réaction de Weil-Felix chez les chiens d'Athènes. [**The Weil-Felix Reaction in Dogs in Athens.**]—*C. R. Soc. Biol.* 1936. Vol. 121. No. 7. p. 634.

During the months February to November in 1934 the sera of 270 dogs was examined for the Weil-Felix reaction. Forty-six or 17 per cent. gave a positive reaction for *Proteus OX19*.

The author considers that these positive reactions are due not to the virus of typhus but to that of boutonneuse fever ; the dogs were infested with ticks and these ticks were found to carry the virus of boutonneuse fever. Cases of this disease were occurring in Athens at the time. *D. H.*

Blanc (Georges), Noury (M.) & Baltazard (M.). Préséance et prémunition au cours du typhus exanthématique et au cours de l'infection inapparente par virus bilié. [**Premunition in the Course of Typhus Fever and in the Course of Inapparent Infection after Bile Treated Vaccine.**]—*C. R. Acad. Sci.* 1935. Dec. 9. Vol. 201. No. 24. pp. 1226–1227.

"Préséance" is defined as a condition, due to the presence of a living germ in the body, which prevents infection by further doses of germs of the same species.

It has been noted by the authors that when people have been inoculated with the living bile-treated typhus virus in the presence of an epidemic of typhus that epidemic has forthwith ceased.

The authors explain this occurrence in the light of the condition of "préséance" in these inoculated people; such a condition is only possible after inoculation with living virus.

In the present paper they bring forward experimental evidence in favour of this theory. Fifteen persons were inoculated with minimal doses of bile treated virus; 10 of these were reinoculated 7 days later with pure virus, only 4 out of the 10 had fever; 40 days after the initial inoculation all the 15 inoculated people were given doses of pure virus and only one, a European who had not received the second inoculation, reacted. *D. H.*

Nicolle (Charles) & Laigret (J.). Vaccination contre le typhus exanthématique à l'aide du virus typhique vivant, desséché et enrobé. [**Vaccination against Typhus by means of Laigret's Dried and Coated Virus.**]—*Arch. Inst. Pasteur de Tunis.* 1936. Jan. Vol. 25. No. 1. pp. 40–54. With 6 charts.

The method of preparation of the vaccine was as described in the paper by Laigret above (p. 427), double envelopment of dried virus (Tunis murine No. 1) in yolk of egg and oil. This envelopment does not neutralize the virus in any way but localizes it. Of 9 people inoculated with a vaccine in which the virus was enveloped in yolk of egg and water 5 developed mild attacks of fever. One hundred and fifty-three people were inoculated with a dried virus in oil—only one of these contracted fever. One hundred and ten people inoculated with the virus in yolk of egg and oil—none contracted fever. It was noted during the investigation that rat brain used as source of virus is more likely to cause fever than guineapig brain; the following method of dosage has therefore been adopted :—

1st dose	1/200 of guineapig brain.
2nd dose (25 days later)	1/200 rat brain.
3rd dose (test dose) ...	1/50 to 1/12 rat brain.

No reaction to test dose in any case. *D. H.*

Sparrow (Hélène). Essais d'immunisation avec le virus murin I de Tunis, introduit par la voie nasale. [**Attempts at Immunization with the Tunis Rat Typhus Virus by the Nasal Route.**]—*C. R. Acad. Sci.* 1935. Dec. 23. Vol. 201. No. 26. pp. 1441–1443.

A few drops of emulsion of the brain of infected rats (Tunis murine Virus No. 1) were instilled into the nostrils of rats and guineapigs; only one rat developed fever but all the animals when tested later were found to be immune to a true typhus virus.

A few drops of the same murine virus No. 1 were instilled into the nostrils of a young man ; 10 days later he developed fever and passed through a typical attack of mild typhus. *D. H.*

Sparrow (Hélène). Essais de vaccination avec les rickettsias du virus murin I de Tunis. [**Attempts at Vaccination with Rickettsia of Tunis Rat Typhus Virus.**]—*C. R. Acad. Sci.* 1935. Dec. 30. Vol. 201. No. 27. pp. 1524–1525.

Nicolle (Charles). Réflexions au sujet de la note précédente de Mme. Sparrow.—*Ibid.* p. 1526.

The author has noted that if lice are fed on patients suffering from endemic typhus in Tunis they do not become infected, but she has succeeded in infecting lice by the rectal injection of Tunis murine virus No. 1.

The infected lice die on or about the 4th day with large numbers of Rickettsia in the intestine.

The contents of 5 to 10 infected lice intestines were injected intraperitoneally into guineapigs and rats ; none of the animals developed fever but when tested later 4 out of 6 guineapigs were immune to a true typhus virus and 4 out of 5 rats were immune to the rat virus No. 1. The method of instilling the louse virus into the nostrils and conjunctiva of rats and guineapigs was also employed—none developed fever but immunity was produced. The same virus dropped in the conjunctiva of a young man produced no reaction whatever.

Professor Nicolle in a footnote emphasizes the point that passage of Tunis rat virus No. 1 through lice attenuates the virulence of the virus for experimental animals and for man. *D. H.*

Giroud (Paul) & Plotz (Harry). Esssai sur les variations du pouvoir infectant et vaccinant des cultures des virus typhiques en fonction des voies d'introduction. [**Variations in the infecting and vaccinating Power of Cultures of Typhus Virus according to the Route of Infection.**]—*C. R. Soc. Biol.* 1936. Vol. 121. No. 4. pp. 312–313.

Cultures of typhus virus obtained by the method of Nigg and Landsteiner were employed in this research.

The cultures were introduced into experimental animals by various routes, intracerebral, conjunctival, nasal, by the digestive route, on the scarified skin and intradermally. Of these routes the intradermal, subconjunctival, and nasal gave the greatest number of infections and produced the best vaccinating effects. *D. H.*

Le Chuiton (F.), Mondon (H.), Berge (Ch.), Pennanéac'h (J.) & Dubreuil (J.). Importance de la voie testiculaire pour la mise en évidence chez le cobaye du typhus endémique observé chez l'homme. [**Importance of the Testicular Route in infecting Guineapigs with the Virus of Endemic Typhus from Man.**]—*Bull. Acad. Méd.* 1935. Dec. 3. 99th Year. 3rd Ser. Vol. 114. No. 39. pp. 530–532.

It has always been difficult to isolate the virus of endemic typhus from cases of the disease, especially so in the case of the Toulon ship virus.

The authors now find that if blood taken at the height of the fever is injected directly into the guineapig testicle instead of intraperitoneally the virus can be recovered in a large percentage of cases. *D. H.*

Dubois (A.) & Noël (G.). Essais d'immunité avec la souche de typhus exanthématique de l'Urundi. [**Immunity Experiments with Typhus Virus from Urundi, Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. Sept. 30. Vol. 15. No. 3. pp. 349–359.

The author brought 2 strains of typhus in guineapigs from Urundi, Congo, to Belgium. One strain was obtained directly from the blood of a case of fever the other from lice fed on a case of fever.

When inoculated into rats these 2 viruses did not produce fever but when tested later these animals were found to be immune to typhus virus; also when Congo virus was injected into rabbits the serum of these animals gave later a positive Weil-Felix reaction. This virus produced fever but no orchitis in the guineapigs. Guineapigs which had recovered from fever caused by the Congo virus proved to be protected from inoculation with a European rat typhus virus and *vice versa*. The conclusion is that the Congo virus is a true typhus virus of the human type. *D. H.*

Zia (Samuel H.) & Wu (Chao-Jen). **Protection against Experimental Typhus Infections (Peiping Strain) with Immune Mexican Typhus Serum.**—*Proc. Soc. Experim. Biol. & Med.* 1935. June. Vol. 32. No. 9. pp. 1406–1408. With 2 charts.

The authors obtained some of Zinsser's antityphus horse serum from America and tested its protective power against a local strain of human typhus virus.

Guineapigs were injected with 1/15 of a suspension of the brain of an infected guineapig and 24, 72 and 120 hours later 1 cc. of immune serum was injected; normal serum was injected into control animals. None of the animals receiving the immune serum developed fever; all controls reacted. *D. H.*

Le Chuiton, Berge (C.) & Pennanéac'h (J.). Transmission expérimentale au chat du typhus murin (souche toulonnaise). Premières considérations sur cette transmission. Présence du virus dans l'urine. [**Experimental Infection of the Cat with Rat Typhus Virus.**]—*Bull. Soc. Path. Exot.* 1935. Oct. 9. Vol. 28. No. 8. pp. 685–688.

The virus used in this investigation was a rat typhus virus isolated from rats in the ships of war in Toulon Harbour.

Young cats were injected with emulsion of brain of infected guineapigs; these cats had a few days' fever without orchitis and the brain and urine of the cats was shown to be infective. Cats were also infected by being fed on the brains of guineapigs. The virus, after passage through cats, showed some loss of virulence for the guineapig. *D. H.*

PARKER (R. R.). **Rocky Mountain Spotted Fever. Epidemiology with Particular Reference to Distribution and Prevalence in the Western United States.**—Reprinted from *Northwest Med.* Seattle. 1935. Apr. Vol. 34. No. 4. pp. 111–121. With 9 maps & 6 charts. [11 refs.]

"Since Rocky Mountain spotted fever was first [1890] recognized as a specific infection in the northern Rocky Mountain region of the United States, there has been a vast extension of the geographical limits within which endemic foci are known to be present. The territory now included involves a very large part of the United States and extends northward into at least southern Canada. In the western United States the pushing out of the known limits of endemicity has been more or less gradual over the past thirty years, but definite knowledge of occurrence in the . . . . Mississippi valley and eastern states . . . has essentially all been secured within the past three years."

The above is the thesis of this able study of the epidemiology of Rocky Mountain fever.

Figures are given of the number of cases of the disease reported and these cases are shown graphically on a map of the western States, the interesting point being that all these areas of prevalence lie within the range of the Rocky Mountain wood tick *Dermacentor andersoni*.

It is noted that there is a definite cyclic prevalence of the disease in the western States; there may be many cases in one year and few or none for a year or two followed again by a year with many cases. In one area a few cases each year were noted for 4 years followed by a period of ten years without any cases when the disease again appeared. The explanation of this cyclic prevalence lies probably not so much in the relative abundance or scarcity of ticks but in the number of ticks which are actually carrying the virus.

As regards the spread of the disease to other areas the question is discussed whether this is a true outward expansion of the endemic areas or whether the disease has occurred there previously and escaped detection. The following possibilities are suggested to account for the regional distribution as at present known: (1) That long ago foci of Rocky Mountain spotted fever were scattered throughout a much larger part of the Rocky Mountain region than was then suspected or has since been generally supposed; (2) that from such foci there has been an intensive dispersal of the virus to adjacent territory but only within the *D. andersoni* range; (3) that this dispersal has been accomplished by the intensive spread of *D. andersoni*. But there is no evidence that *D. andersoni* has become established in the eastern or central States; in these States *D. variabilis* and *occidentalis* and possibly *R. sanguineus* are concerned. As regards the occurrence of Rocky Mountain fever in the eastern States the question again arises, is this a new disease in these areas or has the disease been present there for many years and unrecognized? If the disease has recently been imported into these new areas out of the range of *D. andersoni*, is it by means of importation of infected *andersoni* ticks? The author considers that there is no evidence of spread by this means but suggests that the rabbit tick, *H. leporis palustris*, may be responsible for the spread of the virus, although not directly responsible for human cases of the disease as it does not bite man; this tick is not confined to the Rocky Mountains but is found on most species of rabbits wherever these small rodents are found in the United States. Thus the virus of

spotted fever may have existed, as it is known to exist at present in nature in a low grade phase that does not produce frank recognizable infections in man and such strains of virus may sooner or later assume an increasing virulence and become capable of causing clinically recognizable symptoms. This virus is spread and kept alive in the rodent population by the rabbit tick and occasionally conveyed to man by ticks such as *D. andersoni* and *variabilis* which bite both rodent and man.

D. H.

i. Bengston (Ida A.) & Dyer (R. E.). **Cultivation of the Virus of Rocky Mountain Spotted Fever in the Developing Chick Embryo.**—*Public Health Rep.* 1935. Oct. 25. Vol. 50. No. 43. pp. 1489–1498. With 3 plates. [19 refs.]

ii. Lillie (R. D.). **Histologic Reaction to the Virus of Rocky Mountain Spotted Fever in Chick Embryos.**—*Ibid.* pp. 1498–1501.

i. The method of Goodpasture was employed and the virus selected for experiment was the Bitterroot strain of Rocky Mountain spotted fever.

A small window was cut in the egg shell and the membrane was infected by means of a syringe, the inoculum in the first case being a few drops of emulsion of infected guineapig brain and, later, emulsion of infected chick embryo membrane in series. (Twenty such passages were made.) The "window" was vaselined around the edge and covered with a sterile cover slip and was observed through a dissecting microscope. It was noted that many of the embryo chicks died on the 5th to the 6th day after the inoculation; that these fatalities were due to the virus was probable because control embryos inoculated with endemic typhus virus did not succumb. It was found by experiment that the virus was not confined to the membranes but its presence could also be demonstrated in the organs of the chick, especially the liver and brain. Infected membrane viewed through the cover glass window showed small discrete cloudy areas which subsequently coalesced.

Rickettsia were found in the cytoplasm of the epithelial cells in all generations after the tenth. Emulsions of the infected membranes from 54 infected eggs were injected into guineapigs; 104 were inoculated and all developed fever and showed symptoms identical with that produced by the virus from the tick.

Seventy-two out of 80 guineapigs died; 6 of those which recovered were tested with the Bitterroot virus and proved to be immune.

ii. Sections were cut out of the entire chick embryo, these were stained by Romanowsky, Weigert and van Gieson stains and studied.

Lesions began to appear on the 9th or 10th passage generation about the same period that Rickettsia began to appear.

The significant features of these lesions appear to be vascular adventitial proliferation, lymphocytic infiltration and occasional endovascular lesions.

D. H.

Ogata (Norio). Die Tsutsugamushi-Krankheit. "Rickettsia tsutsugamushi." [**Tsutsugamushi Fever. Rickettsia tsutsugamushi.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Dec. Vol. 39. No. 12. pp. 491–505. With 8 figs.

A review of work done by the author and other Japanese research workers on tsutsugamushi fever read before the Institute of Tropical Diseases in Hamburg in November 1935.

In his summary of the review the author states that the problem of the aetiology of the fever which had engaged the attention of research workers in Japan for 50 years was finally solved by his discovery in the year 1927 of the cause of the disease, Rickettsia tsutsugamushi, by the injection of the blood of cases of the fever into the testicle of rabbits and passage of the virus by this means for many generations, the Rickettsia being readily demonstrated in the testicular tissues by various staining methods.

The author has also shown that the mouse is a very suitable animal for experimental work and tissue culture of the virus has been usefully employed. *D. H.*

YOSHIDA (Shizuo). **On the Tissue Culture of Tsutsugamushi Virus** (*Rickettsia tsutsugamushi*).—*Kitasato Arch. Experim. Med.* 1935. Oct. Vol. 12. No. 4. pp. 324–337. With 6 figs. on 1 plate.

The inoculum employed in these experiments was the infected parenchyma of rabbit's testicle.

The medium consisted of 1 drop of infected extract of testicle in Ringer's fluid and 2 drops of heparinized rabbit plasma. The slide cover slip method was employed and the specimens were incubated at a temperature of 28° to 32°C. Every 3 or 4 days specimens were stained and examined and animals were inoculated from the cultures. Rickettsia appear on or about the 8th day and after 2 weeks cultivation are found in 100 per cent. of the cultures.

The virus could be kept alive in culture up to 36 days without transplantation, but can be kept much longer by addition of fresh plasma and fresh tissue cells.

The author refers to his method of "total staining"; this consists in taking the cover slip on which the culture rests, allow the cells to settle on the glass and remove all the fluid media, fix the cells then wash thoroughly and stain. This gives much better results than smear preparations of the cells. *D. H.*

KOUWENAAR (W.) & WOLFF (J. W.). Sumatranisches Milbenfieber: Eine Krankheit der Fleckfiebergruppe. [**Sumatran Mite Fever.**]—*Zent. f. Bakt.* I. Abt. Orig. 1936. Jan. 13. Vol. 135. No. 7/8. pp. 427–436. With 4 figs. [16 refs.]

This paper is a résumé of work done in the Dutch East Indies by the authors on the 3 types of the typhus group of fevers which occur there, and already noted in the *Bulletin*.

1.	Sumatran mite fever	*XK*	+ primary sore
2.	Scrub typhus	*XK*	no primary sore
3.	Endemic typhus	*X19*	,, ,,

Experimental work on the viruses of these diseases and the virus of Japanese river fever employing rats, rabbits, guineapigs, mice and monkeys is very fully reported. The conclusions arrived at are that Sumatran mite fever and Japanese river fever are not identical although clinically they resemble one another very closely; the virus of Sumatran mite fever produces a severe and often fatal disease in guineapigs and a mild infection in monkeys whereas the reverse is the case with the virus of Japanese river fever, also monkeys which have recovered from Japanese river fever are susceptible to the virus of Sumatran mite fever.

The authors also consider that scrub typhus is Sumatran mite fever without the primary sore [see also O'Connor, above].

The primary sore in Japanese river fever and in Sumatran mite fever is due to the injection of the virus by the mite directly into the skin; if scrub typhus is carried by a tick this vector would inject the virus not directly into the skin but subcutaneously and this might explain the absence of the primary reaction in these cases.

[This suggestion of the authors is not applicable in the case of boutonneuse fever and African tick bite fever both of which are carried by ticks and in both primary sores are almost invariably present.]

D. H.

Bessem (N.). Een geval van Mijtekoorts in de Westerafdeeling van Borneo. [**A Case of Mite Fever in the Western Division of Borneo.**] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Oct. 29. Vol. 75. No. 22. pp. 1909–1910.

This case appears clearly to have been one of mite fever. The disease occurred in a full European, 55 years of age. On admission to hospital with a temperature of 39·4°C. ten days after its commencement he complained of severe headache and pain in the loins; his face was suffused, the conjunctivae injected, the mouth and lips dry and he looked ill. There was a painful lymph node in the groin corresponding to a skin lesion of the size of a pin head on the scrotum. Around the lesion, the "primary lesion," there was bleeding and hyperaemia. The patient became dull, had severe cough without sputum and a continuous temperature ranging between 38°C. and 40·5°C. Urine and faeces showed nothing abnormal. He died 12 days after admission. The diagnosis was clinched by the serological findings: negative agglutination for *Proteus X19* and positive 1–1,500 for *Proteus X* Kingsbury, while the agglutinations for typhoid and paratyphoid organisms were negative. *W. F. Harvey.*

PAPPATACI FEVER.

Cogollo Duque (José). Una epidemia de papatasí en Arjona, Bolívar (Colombia). [**An Outbreak of Pappataci Fever in Arjona.**]—*Bol. Oficina Sanitaria Panamericana.* 1935. Dec. Vol. 14. No. 12. pp. 1143–1146.

Malaria is usually widespread in November onwards after the heavy rainfall of August and October but dies down early in the year. In March 1935, however, there were many cases of fever and these were at first diagnosed as malaria, but it was soon noticed that the fever lasted for about 3 days only and was accompanied by intense headache and general pains, redness and congestion of the eyes and, in short, the typical symptoms of pappataci fever; epistaxis was not uncommon and in children convulsions occasionally. There was considerable depression with lassitude and asthenia after the fever and convalescence was delayed for 1–2 weeks. The outbreak kept on until July and about 25 per cent. of the population (which was about 15,000) were attacked.

H. H. S.

Peschle (Bruno). Osservazioni cliniche su un epidemia di febbre da papataci. [**Observations on an Outbreak of Pappataci Fever.**]—*Pediatria.* 1936. Jan. 1. Vol. 44. No. 1. pp. 41–51. English summary (6 lines).

The author has made an exhaustive clinical study of an outbreak of pappataci fever which occurred in Istria in 1933. Persons of all ages—adults, school children, children of pre-school age, and infants below 2 years—were attacked. Whereas in adults and older children the symptoms and clinical course were typical and presented no difficulty in diagnosis, in the infants and young children many of the characteristic features might be lacking and diagnosis difficult especially in sporadic cases. There is no need here to speak of the classical symptoms of a typical attack, but attention should be called to the differences which the author noted in children. Whereas the fever in adults was about 40°C., in some cases it might be higher in infants, but in still more it kept low, 38°C., and came to normal by the second or third day. Even when it was 40°C., there was no marked constitutional disturbance. The bradycardia, usual in adults, became less with fall in age and in infants was never seen. Convulsions at the onset were seen only in patients over 12 months old and then not unless the fever was high. The persistent redness of face and neck was always present in those over 2 years, lasting even after the fall in the temperature, and was a useful diagnostic sign. Scarlatiniform rashes in the region of the joints were seen in about one-fifth of those of pre-school age; herpes, frequent in adults, was seen only once among the children, a boy of 12 years. Epistaxis, common in adults and in late childhood (40 per cent. of the last showed it), was present in only 5 per cent. of those between 5 and 10 years and not seen at all in infants. Diarrhoea, with loose, mucoid, fetid stools, occurred in 70 per cent. of children of school age, even on the first day of illness; vomiting was present in about half the infants, but never severe; in about 30 per cent. of older children and in 10 per cent. it recurred on successive days. In adults and older children leucopenia with relative lymphocytosis and monocytosis was the rule, but in infants half showed leucocytosis with relative

polymorphonuclear increase, and there was no eosinophilia, in fact in 67 per cent. there was a reduction. Nervous sequelae were never seen in children. Prognosis is always favourable ; no fatalities occurred.

H. H. S.

THEODOR (Oskar). **A Study of the Reaction to Phlebotomus Bites with Some Remarks on "Harara."** ?—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Nov. 25. Vol. 29. No. 3. pp. 273–284.

The reaction to sand-fly bites is allergic in nature. The disease called " harara " in Palestine is the result of these bites in a sensitized subject.

The author studied the effect of successive bites by *Phlebotomus papatasii* on some 17 subjects who had not previously been bitten. After the first occasion of being bitten, the reaction usually takes several days to develop ; then intensely itching papules appear. After subsequent bites the papules appear more rapidly (less than one day) and the site of the preceding bites may become inflamed again. This is interpreted as a process of progressive sensitization to the antigen in the insect's saliva. In subjects who have been repeatedly bitten large pale wheals develop locally within a few minutes ; and these are followed by the papular reaction. This is regarded as the beginning of desensitization. Ultimately the papular reaction is entirely wanting. Theodor supports the view of DOSTROWSKY that the disease known as " harara " in Palestine is " nothing else than the reaction to phlebotomus bites."

V. B. Wigglesworth.

OROYA FEVER.

WEINMAN (David). Les parasites érythrocytaires révélés par la splénectomie : Bartonella et Epérythrozoon. [**Bartonella and Eperythrozoon revealed by Splenectomy.**]—102 pp. [11 pages of refs.] 1935. Paris : Amédée Legrand, Editeur, 93 Boulevard St. Germain.

Since the discovery by BARTON in 1901 of the bacillus-like organisms in the blood of a case of Oroya fever and their naming *Bartonella bacilliformis* by STRONG and his co-workers in 1915, and the important observation of MAYER, BORCHARDT and KIKUTH in 1926 of the appearance of similar organisms, which they called *Bartonella muris*, in the blood of rats after splenectomy, a very extensive literature has sprung up on the conditions in animals following splenectomy and the occurrence of *Bartonella*, of which a number of new species have been established. In addition an entirely new form, named *Eperythrozoon coccoides* by its discoverer, was noted in splenectomized mice by Victor SCHILLING in 1928. Already a number of species of this curious organism have been described, while other types not yet classifiable have come to light. As a subject for a thesis the author has chosen the above-mentioned parasites, and while describing certain experiments of his own has reviewed the 200 to 300 papers which have been published on the subject. This review will undoubtedly be of great service to those who wish to work with these parasites, and is a valuable book of reference. *C. M. Wenyon.*

DENGUE.

CHENEY (Garnett). **Appearance of a Dengue-like Fever in Northern California.**—*Arch. Intern. Med.* 1935. Dec. Vol. 56. No. 6. pp. 1067–1096. With 7 figs. [46 refs.]

Late in the spring of 1934 a patient was seen in San Francisco who presented a clinical picture like that of dengue. Two cc. of whole blood taken from this patient on the 3rd day of fever and inoculated into a volunteer produced the symptoms and signs of inoculation dengue, subinoculations in 3 other successive persons reproduced the same type of illness in each. Five more similar cases were subsequently detected in the city. Full clinical details of all 10 cases are given in the paper with fever charts which show the typical saddle-backed type of fever ; severe pains in bones and joints, flushed face and eyes, rash, jaundice and itching of the skin were all noted.

The author prefers for the time being to designate these cases as dengue-like fever for the following reasons :—

(1) The vector of dengue fever *Aëdes aegypti* has not been found in Northern California.

(2) It was not possible to prove that these cases were due to a filterable virus.

(3) Nor was it possible to test these people for immunity to the virus of dengue. *D. Harvey.*

O'Meara (F. J.). **Dengue Temperature Charts.**—*Jl. Roy. Army Med. Corps.* 1936. Feb. Vol. 66. No. 2. pp. 120–124. With 7 charts.

Seven specimen temperature charts of cases of dengue are given; these cases occurred in young male Europeans some in Cairo and some in Calcutta. The cases were mild, bone pains were not severe and did not merit the term " break bone." The majority of the charts are of the typical saddle-back type but one shows the " terminal rise chart " of Rogers.

The Widal and Weil-Felix reactions and blood cultures were negative.

D. H.

TROPICAL OPHTHALMOLOGY.

A Review of Recent Articles. XXV.*

Conjunctiva.—Kanda[1] has described a form of *conjunctivitis* accompanied by an acute pustular dermatitis due to the invasion of the conjunctival sac by a flying insect which he calls "*Paederus idae lewis.*" The conjunctivitis is frequently complicated by a diffuse superficial keratitis. Complete recovery is usual in a few days; a two per cent. solution of bicarbonate of potassium has been found to be a useful eyewash. [The trouble appears to be closely related to that described by Elliott in his *Tropical Ophthalmology* as caused by "Yellow Moth."]

Trachoma.—MacCallan[2] in his Hunterian Lecture has furnished a comprehensive review of the disease. He describes the changes as a generalized flooding of the subepithelial tissue of the membrane with lymphocytic cells; the follicles which are so often present are part of this general exudate; these, however, differ in no way from the similar aggregations of cells found in follicular conjunctivitis. "The numerous underlying sebaceous or meibomian glands are at first affected by simple blockage of ducts and dilatation, the result of pressure by the cellular infiltration. Later the ducts become strangulated by the developing connective tissue, which begins to take the place of the lymphocytic exudate. The result is the appearance on the surface of the conjunctiva of numerous bleb-like excrescences." He attributes the changes in pannus to an extension of the lymphocytic exudate to the upper part of the limbus by way of the subepithelial tissue of the bulbar conjunctiva. In early trachoma pannus in this area is the only pathognomonic sign of the disease. He emphasizes four main points regarding the disease and its diagnosis.

"(1) The primary epithelial lesion caused by the virus results in an inflammatory reaction in the subepithelial tissue, exhibited by a lymphocytic infiltration. The lymphocytes may be aggregated into follicles, but this is not always the case. When such follicles are present they cannot be distinguished pathologically from similar aggregations of cells which occur in follicular conjunctivitis.

"(2) This lymphocytic invasion of the subepithelial tissue spreads from its area of inception in the tarsal conjunctiva to the corneal limbus, where changes occur peculiar to trachoma.

"(3) The bleb-like excrescences, which exude a gelatinous material when ruptured, have no relation to the so-called trachoma follicles of an earlier stage of the disease.

"(4) The lymphocytic invasion of the subepithelial tissue penetrates the tarsus, and finally is resolved into connective tissue. Hence result the deformities of the lids which occur in no other form of conjunctivitis.

"The last three points differentiate trachoma from any other form of conjunctivitis."

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* For the twenty-fourth of this series see Vol. 32, pp. 895–899.

[1] Kanda (Kanji). On the Ocular Affections caused by the Poison of an Insect called "Aoba-arigata-haneka-kushi or Paederus idae Lewis."—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1935. July. Vol. 34. No. 7 (364). [In Japanese pp. 1004–1012. With 2 figs. English summary pp. 1013–1014.]

[2] MacCallan (A. F.). Trachomatous Conjunctivitis: Its Surgery and Pathology.—*Lancet.* 1936. Jan. 25. pp. 215–217.

The author remarks that ophthalmologists can realize with difficulty that the stigmata of the disease are borne by as many as half the inhabitants of the globe. This seems to the reviewer to exaggerate the incidence of the disease.

Julianelle & Harrison[3] have conducted experiments which suggest that the follicular inflammation induced by the inoculation of trachomatous material in the eye of the *M. rhesus* is specific of trachoma. Fourteen monkeys, inoculated with the material from follicular conjunctivitis, remained unaffected, but when subsequently inoculated with trachomatous material developed folliculosis. They conclude that human trachoma can be transmitted to monkeys while human folliculosis cannot. Further investigations[4] to determine whether the infectious agent in trachoma is filterable tended to show that it is not readily so. Meyerhof & Habachi[5] have found a daily scraping of the conjunctiva followed by friction with some chemical to be successful in the treatment of intractable chronic trachoma. The lids are fully everted after anaesthetization, and the membrane is scraped with a curette or a knife. Scraping is followed by friction with a pledget of wool soaked in perchloride of mercury solution 1 in 1,000, or some other disinfectant. They suppose that the drug used is carried by the vessels directly to the vascularized cornea and there exercises a beneficial action upon the pannus. They recognize, however, that the recovery of a smooth conjunctival surface is the main factor in rendering the cornea more healthy. Treatment may be required for several weeks, or even for several months in severe cases. Paparcone[6] records a diminution from 81 to 60 per 100,000 in the incidence of blindness (of which trachoma is the chief cause) amongst the Italian population during the past twenty-three years. Various factors are responsible, but the chief one is an improvement in hygienic and in housing conditions. Delanoë[7] has recorded a case of successful human inoculation of acute trachoma. An Arab woman, whose children had recently recovered from a long-standing eye trouble, developed a conjunctival inflammation of great severity. The lids were so swollen that eversion was difficult. The conjunctiva was covered with swollen, readily bleeding, discrete follicles whose projection injured the bulbar conjunctiva and cornea. Pain and lachrymation were marked features. Improvement took place rapidly under treatment with chaulmoogra oil. The patient's husband, who had lost an eye in infancy through smallpox, allowed the conjunctival sac of that eye to be inoculated from his wife. This was effected by using a small wool mop to transfer the infected matter. Both the infected and the healthy membranes were well rubbed with the mops. The husband developed symptoms in a week,

[3] Julianelle (L. A.) & Harrison (R. W.). Studies on the Infectivity of Trachoma. II. On the Relation of Human and Simian Folliculosis to the Infection induced by Trachomatous Tissue in Monkeys.—*Amer. Jl. Ophthalm.* 1935. Jan. Vol. 18. No. 1. pp. 10–14.

[4] Julianelle (L. A.) & Harrison (R. W.). Studies on the Infectivity of Trachoma. III. On the Filterability of the Infectious Agent of Trachoma.—*Amer. Jl. Ophthalm.* 1935. Feb. Vol. 18. No. 2. pp. 133–139. [20 refs.]

[5] Meyerhof & Habachi (S.). D'un mode particulier de traitement des formes rebelles du trachome. (Le raclage journalier.)—*Rev. Internat. du Trachome.* 1935. Oct. Vol. 12. No. 4. pp. 189–199.

[6] Paparcone. Sur la diminution du trachome en Italie.—*Rev. Internat. du Trachome.* 1935. Oct. Vol. 12. No. 4. pp. 200–202.

[7] Delanoë (E.). Un cas d'inoculation du trachome aigu de la femme au mari de cette dernière.—*Rev. Internat. du Trachome.* 1935. Oct. Vol. 12. No. 4. pp. 242–245.

and, on being seen about six weeks later, was found to be suffering from an ophthalmia similar to that of his wife.

SELINGER[8] recommends the application of quinine to the conjunctiva. He uses a saturated solution of the bisulphate and applies it on a mop with firm stroking movements until the membrane assumes a bluish milky colour ; usually about one minute is required. The treatment induces some burning sensation, but is much less painful than the application of copper sulphate. The author believes that the drug's action as a protoplasmic poison enables it to destroy pathological accumulations of lymphoid tissue. He records the notes of eight patients who were benefited by the treatment. THYGESON, PROCTOR & RICHARDS[9] have recorded an important observation. Epithelial scrapings from the trachomatous eyes of a number of Indian children were found to contain Prowazek-Halberstaedter bodies. The scrapings were suspended in sterile nutrient broth (pH 7·3) ground thoroughly in a mortar for five minutes and passed through hard filter paper to remove cellular débris ; this emulsion was then filtered through an Elford graded collodion membrane 0·14 mm. thick and of 0·6 micron average pore diameter. One-third of the filtrate was centrifuged and moderate numbers of elementary bodies were found in the sediment. About 1·6 cc. of the sediment was instilled into the conjunctival sac of a volunteer after the membrane had been lightly scarified with a platinum spatula. An acute conjunctivitis resulted in five days. Prowazek-Halberstaedter bodies and free elementary bodies were present in large numbers. The diagnosis of trachoma was established at the end of six weeks by the occurrence of typical trachomatous pannus. The association of the *Bacterium granulosis* with trachoma in Glasgow has been investigated by MEIGHAN & URQUHART[10]. They examined 25 cases which they considered to be undoubtedly trachomatous and succeeded in isolating the micro-organism from 7. In 13 other cases colonies were obtained which had its cultural and morphological characteristics with the exception of glucose fermentation. The authors suggest that failure to isolate the organism from suitable cases of trachoma may sometimes be due to the use of cocaine when obtaining the material and sometimes to having allowed insufficient time for the colonies to develop.

Cataract.—WRIGHT & KOMAN NAYAR[11] operating on a child aged thirteen months for bilateral congenital cataract found that in the lens of one eye there was a solid cataractous foetal nucleus surrounded by a milky fluid ; this was enclosed in turn by an opaque friable shell of cortex. The cataract in the other eye was of a mixed consistence, partly milky and partly friable. The child had suffered from ophthalmia neonatorum from its birth. KHALIL[12] describes Lopez Lacarrère's

[8] SELINGER (Elias). Local Quinine Therapy in Trachoma. Preliminary Report. —*Amer. Jl. Ophthalm.* 1935. July. Vol. 18. No. 7. pp. 631–636. [11 refs.]

[9] THYGESON (P.), PROCTOR (F. I.) & RICHARDS (P.). Etiologic Significance of the Elementary Body in Trachoma.—*Amer. Jl. Ophthalm.* 1935. Sept. Vol. 18. No. 9. pp. 811–813. [12 refs.]

[10] MEIGHAN (S. Spence) & URQUHART (Mary). Trachoma : an Investigation into the Question of the Presence of *Bacterium granulosis* (Noguchi) in Cases of Trachoma in Glasgow.—*Brit. Jl. Ophthalm.* 1936. Apr. Vol. 20. No. 4. pp. 201–204.

[11] WRIGHT (R. E.) & KOMAN NAYAR (K.). Rare Type of Congenital Cataract.— *Amer. Jl. Ophthalm.* 1935. Feb. Vol. 18. No. 2. p. 158.

[12] KHALIL (M.). The Extraction of Cataract by the Electro-Diafaco Method (after Lopez Lacarrère of Madrid).—*Brit. Jl. Ophthalm.* 1936. Mar. Vol. 20. No. 3. pp. 167–175. With 2 figs. [14 refs.]

method of cataract extraction by diathermy needle. A special needle is used to penetrate the lens : this structure coagulates and becomes firmly adherent when the current is turned on. The lens can then be lifted out on the needle. Penetration of the lens is very easy and adhesion firm. Regulation of the current is important in order to avoid insufficient coagulation or an injury to the neighbouring structures. By this technique all pressure on the globe is avoided and there is no danger of dislocating the lens backwards. Khalil suggests that the necessary strength of current may be estimated by placing a piece of raw meat on the patient's forehead before operation and testing the resistance. Only experience can prove whether the advantages of this operation can compensate for the dangers.

Glaucoma.—KIRWAN[13] has described the characteristic features of the type of glaucoma which is associated with *epidemic dropsy*. Both eyes are usually affected and haloes round lights are a constant subjective symptom. The capillaries of the entire uveal system dilate and an increased permeability of their walls leads to an excessive flow of fluid into the anterior ocular segment. The eye remains white and the pupil remains normal although the intraocular pressure is always of a very high order—rarely below 50 mm. The depth of the anterior chamber is either normal or deeper than normal. Cupping of the optic disc is only found in long-standing cases. The high intraocular pressure does not respond to purgation or to meiotics ; indeed it is advisable to avoid the use of eserine. Trephining should be performed as soon as the visual field is affected. Gastro-intestinal lavage may aid the elimination of bacteria and their toxins. A rice-free diet should be adopted and the patient be advised a change of air from the endemic area. The aqueous humour in these cases has been found to contain a toxin resembling histamine, and it is suggested that this is probably the product of specific micro-organisms in the alimentary canal. Kirwan states that " if we can find out the organism and its toxin that is the cause of epidemic dropsy, we have advanced a considerable distance in the elucidation of the whole glaucoma problem."

Sleeping sickness.—BERTRAND[14] has found that *optic atrophy* is fairly common amongst the inhabitants of Togoland. One type of the disease is secondary to a choroiditis and another type is exactly similar to that which follows arsenical treatment. These diseases are found in persons otherwise apparently healthy as well as in treated and in untreated trypanosomiasis patients. Syphilis is stated to be an unlikely cause of the atrophy as this disease is extraordinarily rare in the country. The author urges that an optic atrophy should not be attributed to tryparsamide unless the eye had been proved by ophthalmoscopic examination to have been healthy before the treatment was begun.

Leprosy.—BARROS[15] has found that the acute varieties of leprotic ocular inflammation respond best to some form of desensitization treatment, especially to autohaemotherapy ; specific treatment should be temporarily suspended during its employment, but ordinary local

[13] KIRWAN (E. O'G.). The Ocular Complications of Epidemic Dropsy.—*Indian Med. Gaz.* 1935. Sept. Vol. 70. No. 9. pp. 485–489. With 3 charts & 4 figs. on 1 plate.

[14] BERTRAND (Y.). Réflexions sur certaines lésions du fond d'oeil observées en pays Cabrais.—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 606–611.

[15] BARROS (J. Mendonça). Lepra ocular—tratamento.—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 103–107.

treatment should be carried out. Episclero-conjunctival lepromata and hyperplastic forms of keratitis should be treated by excision and cauterization. Treatment by gold salts has proved disappointing. AMENDOLA[16] stresses the advantages of tarsorrhaphy in cases of paralysis of the orbicularis caused by the disease. Marked involvement of the iris is considered by him to contraindicate an iridectomy. Hyperplastic lesions of the cornea should be operated on " for it brings about an arrest in the course of the disease (Pinkelton's rule)." Treatment of acute ocular lesions should be adapted to the circumstances of the individual patient.

Cholera.—BHADURI[17] has recorded some observations on the ocular complications of cholera. These complications are mostly due to the great loss of fluid by purging, though toxic factors, too, may play a part. Defective lachrymation renders the conjunctiva and cornea vulnerable to secondary infections ; corneal sensation and the blinking reflex are also impaired so that the normal transparency of the cornea is likely to be diminished. Intraocular pressure is lowered and varies inversely with the specific gravity of the blood. No vitreous or lenticular changes could be exclusively attributed to the acute stage of the disease ; but keratomalacia might set in if convalescence was unduly delayed by complications.

Epidemic Dropsy.—BHADURI[18] reports a case of *papilloedema* which occurred during an attack of epidemic dropsy. Both eyes were involved and haemorrhages had occurred in that most affected. Ocular tension was raised, and the eye with the higher tension showed less swelling of the nerve. Central and peripheral vision was excellent in each eye, but both blind spots were slightly enlarged.

The Egyptian Government's Twenty-Second Annual Report of the Ophthalmic Hospital Section for 1934[19] presents the usual valuable statistics, and indicates the active interest taken by the authorities in the prevention and treatment of eye disease in that country. The figures show that 80 per cent. of the existing blindness is due to some conjunctival trouble, and that 39,478 cases of gonococcal conjunctivitis, 21,758 of Koch-Weeks and 884,149 of all forms of trachoma were treated during the year. Considerable attention is given to ophthalmic treatment in schools ; it would appear that 98 per cent. of the scholars were trachomatous at the beginning of the year and about the same number at the end of the period, a fall in the number of the early cases being associated with an increase in that of the cicatricial. A chart demonstrates how closely the prevalence of eye disease rises and falls with the atmospheric temperature.

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[16] AMENDOLA (Francisco). Considerações sobre o tratamento das complicações oculares na lepra.—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 108–114. With 4 figs. on 1 plate.

[17] BHADURI (B. N.). Ocular Complications in Cholera.—*Calcutta Med. Jl.* 1935. Oct. Vol. 30. No. 4. pp. 219–224.

[18] BHADURI (B. N.). Papilloedema in Epidemic Dropsy.—*Calcutta Med. Jl.* 1935. Aug. Vol. 30. No. 2. pp. 91–94. With 4 figs. (2 coloured) on 2 plates.

[19] EGYPT : Ministry of the Interior. Department of Public Health. Ophthalmic Hospitals Section. Twenty-Second Annual Report of the Ophthalmic Hospitals Section, for 1934.—46 pp. With 1 folding chart & 1 folding map. 1935. Cairo. [P.T. 12.]

As might be expected, the ninth Annual Report of the Giza Memorial Laboratory[20] for the year 1934 covers much of the same ground as the above, but enters more fully into details and furnishes particulars regarding the pathological and clinical research undertaken during the year. Various interesting and excellently illustrated cases are recorded.

It is stated that smallpox is a very unusual cause of blindness in Egypt—a contrast to some tropical countries. The research department dealt largely with gonococcal ophthalmia and trachoma. Ophthalmia neonatorum is a very rare disease in Egypt, and gonococcal ophthalmia, though so prevalent, has no clinical or epidemiological connexion with gonococcal urethritis. Dr. Ibraham AHMED made a study of the biological character of the different strains of gonococci found in the conjunctival sac. The organisms were classified into three groups according to their antigenetic complexity—high, low, and medium; the ophthalmic strains mostly belonged to the medium group with an inclination towards the high group. It is important to note that gonococci could always be found in the conjunctival epithelium at the time of the patient's discharge from hospital apparently cured. The Director, Dr. Rowland WILSON, makes some interesting remarks regarding the Prowazek-Halberstaedter body. Some observers consider that the "Elementary bodies," which constitute the cell inclusion, represent the actual virus of trachoma and that this virus is filterable, human inoculations of bacteria-free filtrate containing elementary bodies having given rise to experimental trachoma. Egyptian investigators, however, have failed to find the inclusion in cases of the disease not complicated by a secondary infection. He asks the pertinent question: "Are we therefore dealing with two different diseases?" The proprietary remedy "Arolid" was tried in the treatment of the disease and found not entirely satisfactory. F. H. STEWART found that there is still no clear proof that trachoma virus can pass gradocol membranes of *a.p.d.* 0·6–0·7μ. WILSON & EL TOBGY discuss the influence of the endemic diseases on ocular troubles. Bilharzia appears to have little effect nor could any particular trouble be attributed to ankylostomiasis. Helminthiasis seemed, however, to be responsible for much of the xerotic infections. [But it must be remembered that helminthiasis and malnutrition are frequently associated.]

H. Kirkpatrick.

[20] CAIRO. Ninth Annual Report of the Giza Memorial Ophthalmic Laboratory 1934 [WILSON (Rowland P.), Director].—150 pp. With numerous illustrations. 1935. [25 P.T.]

MISCELLANEOUS.

LARSEN (Albert E.). **Variation of Cosmopolitan Diseases in Tropical and Temperate Zones.**—*Amer. Jl. Trop. Med.* 1936. Jan. Vol. 16. No. 1. pp. 91–100. [22 refs.]

The author selects for discussion cosmopolitan diseases said to differ in incidence and manifestation in tropical and temperate climates. They are—rheumatic fever, scarlet fever, diphtheria, stone in the gall and urinary bladders, cirrhosis of liver, appendicitis, gastric ulcer, cancer, general paralysis and tabes. The 22 papers from which his figures are drawn have all, or nearly all, been noted in this *Bulletin*. A good instance of the truth that reported incidence of a disease depends on opportunity to observe it is that of general paralysis and tabes in Siam. MONTEL among 150,000 patients seen over a period of 23 years saw two cases of general paralysis, whereas MOTAIS, an ophthalmologist, found a "high incidence" of optic atrophy, Argyll-Robertson pupils, lightning pains and ataxia [see this *Bulletin*, 1926, Vol. 23, p. 936]. Larsen states that scarlet fever "has not been reported from Africa." *A. G. Bagshawe.*

[Scarlet fever, though rare in tropical Africa, has been reported from British African Colonies (*e.g.*, Kenya), from Egypt, from French African Colonies, from the Belgian Congo and elsewhere: also positive Dick reactions are sufficiently often obtained in natives to indicate that they are not altogether immune from scarlet fever.—Ed.]

NATIONAL ECONOMIC COUNCIL. **Annual Report of the Central Field Health Station January-December 1934** [LIU (J. H.), Director & KING (P. Z.), Vice-Director].—69 pp. With 1 plate, 4 maps & 5 figs. 1935. Nanking, China, R.C.24.

The following is extracted from a fuller account appearing in the *Bulletin of Hygiene*. The parts here given, it was thought, would be of interest to readers of this *Bulletin*.

III. The *Department of Parasitology* carried out a malaria mosquito survey in Nanking city and two others in the vicinity, at Pakwachow and Sanchaho. At the former of these the spleen rate among 170 school children was 2·6 and the parasite rate 1·6 per cent. Other more distant surveys were made. At Chüjung Hsien a severe outbreak of malaria occurred in the autumn of 1933. In 1934 among 2,000 examined [? all school children or adults also] the spleen rate was 10·0 and parasite rate 8·7. Of 4,108 examined in Kiangsi Province, 19 cities, 54 to 86 per cent. of the troops were found infected, and in 92–97 per cent. the infection was subtertian. Infection had taken place mostly at the Fukien-Kiangsi border. Research included a study of the hibernation of Anopheles in Nanking; on the species present (some have maintained that *A. hyrcanus sinensis* is the only one found in Nanking, but this is probably not the fact); the precipitin tests for sources of feeding; larvicidal fish.

At Tsingkiangpu is a *Kala-azar Research Station*. A preliminary survey was made to find a suitable location for a permanent kala azar

field unit and in the place selected among 172 houses and 982 persons examined 116 and 242 respectively were found infected, or 67·4 and 24·6 per cent. The greatest house infection rate was 83·3 per cent. in Liuchuan and the highest in persons 31·5 per cent. in Chengchuan.

For Helminthological investigations antischistosomiasis units have been established in Kutang near Hangchow, and Chü Hsien ; another to study the epidemiology of Paragonimiasis in Shaohing, Chekiang, and of Fasciolopsis infestation in Shanghai and of both the first and last in Chinkiang. The department has published a *Guide to the Laboratory Diagnosis of Human Helminths* (in Chinese).

Geographical Distribution of Certain Diseases Prevalent in China.

Disease.	*Distribution.*
Amoebic Dysentery... ...	More prevalent in Central and South China.
Ascariasis	Common throughout China.
Bacillary Dysentery ...	Endemic throughout China.
Beriberi	More prevalent in coastal provinces such as Kwangtung, Fukien and Chekiang.
Cestodes	Moderately prevalent in North China.
Cholera	Sometimes epidemic in coastal provinces and Yang Tze Valley. (About 100,000 cases were reported in 1932. Only 7 sporadic cases were reported in 1933 and 6 in 1934).
Clonorchiasis sinensis ...	Prevalent in Kwangtung.
Dengue Fever	Sporadic in South China.
Diphtheria	More common and more severe in North China.
Elephantiasis	Comparatively common in Kiangsu and Fukien.
Epidemic Meningitis ...	More prevalent in the Yang Tze Valley.
Fasciolopsiasis (*F. buskii*)	Endemic in Chekiang, especially in Shaohing (Shaohsing).
Hookworm Disease ...	More common in Central China.
Leishmaniasis Donovani (Kala-azar) ...	Prevalent north of Yang Tze River, especially in Shantung, North Kiangsu, and North Anhwei.
Malaria	Prevalent in South and Central China ; rare in the North-west.
Measles	Endemic throughout China.
Paragonimiasis Westermanii	Sporadic in Coastal provinces.
Plague	Sporadic in Fukien ; reported epidemic in Shansi, Shensi, and Suiyuan in 1928–29 and in Shansi and Shensi in 1931.
Relapsing Fever ... ... (*S. recurrentis*).	More prevalent in North China.
Scarlet Fever	More common and more severe in North China.
Schistosomiasis	Prevalent in lower Yang Tze region.
Smallpox	More common in rural areas.
Syphilis	Common in large cities.
Trachoma	Common throughout China.
Tuberculosis	Common throughout China.
Typhoid and Paratyphoid Fevers.	Endemic throughout China.
Typhus Fever	Sporadic in South China ; endemic in North China.

H. H. S.

ANIGSTEIN (Ludwik). **First Report on the Medical Survey of Liberia (Central Province of the Hinterland).**—8 pp. 1936. Jan. Govt. Printing Office, (Dept. of State), Monrovia, Liberia.

The survey, which occupied three weeks during which 200 miles were traversed, was directed mainly to the incidence of malaria, yaws, and leprosy, to smallpox vaccination and infant mortality. A mass clinical examination of the population was carried out and when possible blood samples were taken.

Malaria.—Of 1,022 children whose spleens were palpated, in 656 or 64 per cent. enlargement was detected, indicating hyperendemic malaria. The method was that of SCHÜFFNER, all but about a hundred being of Grades I and II (lesser enlargement) and 13 spleens reaching the navel (Grade IV).

Yaws is widely distributed and it is stated that every patient admitted to the hospital of the Firestone Plantations receives an anti-yaws treatment. Of the 1,022 children 80 had a typical yaws eruption and " crab yaws " was noted in 593 of 1,504 adults ; arthritis of finger and toe joints, possibly due to yaws, was frequent. The author comments on the disablement entailed by crab yaws.

Leprosy in its advanced state is recognized by the people and the victims are exiled to the bush. The author saw 19 trophoneurotic and nodular forms, 18 in one town, all very severe.

According to a former estimate there are about 2,000 lepers in Liberia.

The technique of a vaccinating sanitary inspector was observed ; it is criticized as likely to lead to infection and to the apprehension which is general among the natives.

The infant mortality was studied by questioning 272 mothers ; the conclusion is that it approaches 450 per mille. Recommendations are made for the improvement of health. Four tables give details of the results of the survey in a number of towns. *A. G. Bagshawe.*

BLANCHARD. L'École de Médecine de l'Afrique Occidentale Française de sa fondation à l'année 1934. [**History of the School of Medicine at Dakar, French West Africa.**]—*Ann. de Méd. et de Pharm. Colon.* 1935. Jan.–Feb.–Mar. Vol. 33. No. 1. pp. 90–111.

To those who take part or are interested in medical education in British Colonies and those who may contemplate undertaking medical education in Colonies or Dependencies where institutions for this purpose do not at present exist the following account of the French West African School of Medicine will be informative.

The school was opened in Dakar on 1st November, 1918, with a view of training native men to become medical practitioners, native women for midwives, and giving instruction also to veterinary pupils. A year later a section for veterinary medicine and another for pharmacy were inaugurated. In 1924 the veterinary section was moved to Bamako. The original decrees were subsequently modified, changed and added to, and the school is now regulated by those of 1927 and 1930, and by the last a section of visiting nurses was established.

Most of the medical and pharmacy students come from the William Ponty School in the Isle of Gorée, and this school itself obtains its pupils from other, higher grade, schools in the country, the pupils having by that time had 8–9 years' teaching and being at least 17 years

old. At the end of a year in the William Ponty School the teachers meet to decide concerning the fitness of the pupils, and divide them into those who will continue with teaching and education and those who may branch off to medicine. During the next year the latter, in addition to general subjects, also specialize in natural science, physics and chemistry. They then undergo examination preparatory to entering the School of Medicine. The examination appears to be no easy matter ; it comprises dictation and questions which include two on Greek and Latin roots, French composition, mathematics, physics and chemistry. Prior to admission they have to be passed as physically fit and to give a promise to serve as Native Medical Assistants for 10 years dating from their appointment to the roster ; the declaration is signed by the father or guardian. If this is violated, except on ground of ill-health, the money spent on the boy's education has to be refunded to Government.

Prospective midwives have to be between the ages of 18 and 25 years and to have attained a certain standard of education, tested by examination in spelling and writing, in French composition and arithmetic. Since 1932 there has been an average of 70 candidates for 20 vacancies.

Since 1921 and till 1934 there have been 148 qualified as doctors, 21 as pharmacists, 191 as midwives and 38 as visiting nurses. The courses are 4 years for doctors, 3 for pharmacists or midwives, and 2 for the nurses.

The medical school is under a Director who is in nominal charge of the hospital and the various clinics and is administrator in chief ; he is aided by an Assistant Director who also is in charge of the discipline of the students. A Matron is in control of the midwives' section and sees to their training and general discipline and also that of the visiting nurses. There is a School Council of the professors and teachers to discuss the curriculum and any changes of it, classifying the students after examination, referring for further study those who fail to attain the required standard.

In 1931 the school was moved to new buildings which are said to be very fine, up to date and well equipped, with library, laboratories, demonstration and lecture rooms, cinema apparatus, anatomy room with receptacles for preservation of bodies, etc. The students wear uniform. A time-table of the work is given.

The hospital services comprise special departments and clinics : for fractures instituted in 1919, for tuberculosis in the following year ; a special block for mental patients was constructed in 1923, for women and children, for eye, ear, nose and throat diseases, and for skin and venereal affections in 1931 when the transfer to new buildings took place. The number of in-patients in 1934 was nearly 5,000. A Maternity Department was opened at the end of 1931 with 60 beds for women and 60 for infants. Finally, a polyclinic was started at the school but was too far from the town and it was therefore moved there in June 1929. It comprises : consultation rooms, a tuberculosis dispensary, consultations for respiratory diseases, dispensary for venereal patients and a dermatological department, consultations for ophthalmic and aural conditions, and a dental department, a prenatal, gynaecological and infant welfare section.

After being in practice 6–8 years the native medical practitioners return for a postgraduate course of 6 months and an examination for promotion to Assistant Medical Officer, of the First Class. The courses for pharmacists and for midwives are equally thorough. Many points

other than those referred to above are included in the full account, but these remarks will suffice to show the activities of the Dakar School of Medicine. *H. H. S.*

BLANCHARD. La formation des auxiliaires médicaux dans les colonies françaises. L'École de Médecine de l'Afrique Occidentale Française à Dakar. [**Medical Assistance in the French Colonies. The Dakar School of Medicine.**]—*Bull. Office Internat. d'Hyg. Publique.* 1935. Aug. Vol. 27. No. 8. pp. 1575–1592. With 4 figs. on 2 plates.

The Dakar school was opened at the end of 1918 and has afforded training for medical men, veterinarians, pharmacists, nurses and midwives. Its pupils are drawn from the Sudan, Senegal, Dahomey, the Ivory Coast, Guiana, Sierra Leone, Nigeria, Togo, Liberia and Haute Volta. The course is 4 years for medical students, 3 for pharmacists and midwives. There is a Director and Assistant Director, nominated by the Governor General of French West Africa, with a Board of Professors. The article gives accounts of the curriculum, the clinical and other facilities, the examinations and the prospects of those who undergo training at the school. Illustrations are given of the buildings, the maternity section, the operating room and a laboratory, which show the buildings to be handsome and substantial and the interior well equipped.

H. H. S.

FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research for the Year 1933** [MARTIN (P. H.), Acting Director].—143 pp. 1934. Kuala Lumpur. F.M.S. Govt. Press.

This excellent report covers a wide range. The main subjects of research were malaria and tropical typhus, and except for a note to the effect that there were two cases of melioidosis—one in a man and one in a dog—these are the only sections of the report dealt with in this summary.

Malaria.—Dr. Richard Green continued his investigations into the use of atebrin. In the Annual Report for the previous year (this *Bulletin*, 1934, Vol. 31, p. 728), he reported that in the treatment of hospital patients there were fewer relapses after a course of atebrin than after a course of quinine. He has now tried it on rubber estates, beginning with a mass treatment of the whole population and subsequently treating all cases of fever which occurred. The results were excellent; during the whole period the working efficiency of the labourers was maintained at a high level; during the most malarious season only 2 per cent. of the available working days were lost owing to fever. The results of quinine treatment, as it is usually given on estates, were much less satisfactory. This is not attributed to the inferiority of quinine, but to the difficulty of giving it. Quinine costs only about a third of the price of atebrin, and if it were given in curative doses over short periods it might prove more satisfactory than atebrin. The usual practice on estates is the haphazard administration of quinine in sub-curative doses which have little effect. The estate dresser may wish to give more quinine, but the labourers will not take it because it produces symptoms of cinchonism and interferes with their work. "The poor results obtained among the quinine-treated group were regarded as no condemnation of quinine but rather as a demonstration of the wastefulness and

ineffectiveness of giving long-continued and interrupted courses of quinine in a dosage averaging about ten grains daily." The great advantage of atebrin is the willingness with which the labourer takes it. "The fact that the daily dose of atebrin can be given at one muster, also the willingness of estate labourers to take atebrin without fear of cinchonism, both assume an importance in obtaining efficient treatment." There are many difficulties in the way of drug control; one is the continual change in the personnel of the labour force; "in certain circumstances the rate of change in the estate populations may be so rapid that whether atebrin or quinine is to be used would become a matter of indifference."

It can hardly be expected that the results of atebrin administered by the staff of an estate, as a part of the ordinary routine, will equal the results of treatment by experts during a special investigation. Much depends on the dresser in charge; on most estates he has no microscope and cannot distinguish between malaria and fevers of non-malarial origin. During the course of this investigation it was found that only 58 per cent. of the cases of fever were due to malaria. Dr. Green concluded that atebrin was the best drug available for giving "mass" or "blanket" treatments, because quinine administered in curative doses gives rise to symptoms of cinchonism which render the labourers unfit for work; but "at no time, during any of the experiments with atebrin, was justification found for reduction of the oiling programme just because mass treatments with atebrin were being given."

Dr. Green has made a number of investigations into the relative avidity for human blood of the various Malayan species of anophelines when placed in feeding cages. The most avid was *A. maculatus*: 71 per cent. of 2,688 took human blood; *A. hyrcanus* var. *nigerrimus* came next with 57; *A. aconitis*, 43; *A. philippinensis* and *A. hyrcanus* var. *sinensis* 37; *A. subpictus* 31; *A. barbirostris* 28; *A. sundaicus* 21 per cent.

Attention is drawn to the difficulty of distinguishing the öocysts of *P. falciparum* and *P. vivax* from those of the monkey parasite, *P. inui*, at certain stages of development. The position has been further complicated by the finding of malarial parasites in other Malayan mammals the flying fox, the common squirrel and the house bat.

The Entomologist, Mr. E. P. Hodgson, carried out special investigations on a rubber estate. He found that the maximum incidence of *A. maculatus* occurred at the end of March, with a secondary rise in September. The larval densities of *A. maculatus* and *A. karwari* were found to correspond closely with the adult densities, contrary to the findings of workers in other parts of the country. Precipitin tests were made with blood from wild anopheles, and the results showed that *A. maculatus* was predominantly anthropophilic; 84 per cent. of this species contained human blood as compared with an average of 24 per cent. for other species. Two of these others, *A. barbirostris* and *A. hyrcanus*, appear to be facultative zoophiles; they act as carriers in the towns where the population is dense and where there are few animals. An outbreak due to these mosquitoes is reported from a low-lying district in the town of Batu Gajah, where nearly 3 per cent. of the *A. barbirostris* were found to be infected. Experiments were made with Professor Williamson's sluicing method of control. This method consists of the construction of reservoirs in the course of a stream, the object being to wash away the larvae at intervals by releasing the

dammed-up water. The results were not successful, owing to the friable soil of the lowlands the flood gates were repeatedly washed away, and the necessary alterations in the shape of the drains increased the number of breeding places. Many other interesting observations are recorded ; for example, *A. baezi* and *A. sundaicus* (*ludlowi*) were found breeding by the sea in pools with a salt content of about one-third that of sea water.

Tropical typhus and Japanese river fever.—Dr. R. Lewthwaite and Dr. S. R. Savoor continued their investigation into the viruses of tropical typhus and Japanese river fever. They have carried on the " Seerangayee " strain of the rural, scrub, or " K " type of tropical typhus in guineapigs to the 58th generation, and the " Manikam," urban, or " W " strain to the 46th. The " Wellington " strain of Japanese river fever is now in its 54th generation in the eyes of rabbits. Cross-immunity tests were made with the three strains, using the intraocular method in rabbits, and the previous year's findings (in guineapigs) were confirmed, *viz.*, that while the viruses of scrub typhus and Japanese river fever are immunologically the same, there is no cross immunity between these viruses and that of the urban or " W " form of tropical typhus.

Unlike " *le typhus murin* " of Nicolle, the virus of the " K " type does not produce a well marked reaction in white rats. The " Seerangayee " or " K " strain has never produced a macroscopic scrotal swelling in guineapigs, or local rats, such as is produced by the " Manikam " or " W " strain. An attempt was made to immunize guineapigs against the " K " strain by the inoculation of formalinized brain passage virus, but no protection resulted.

Cross immunity tests with the virus of Rocky Mountain spotted fever and the viruses of the two types of tropical typhus showed that there was no cross immunity between them. The spotted fever virus was sent to the laboratory from Montana, U.S.A., in infected ticks. No difficulty was experienced in maintaining it in guineapigs, it nearly always caused scrotal swelling, it was difficult to maintain in rabbits' eyes, it produced *X19*, not *XK*, agglutinins. In short, it was more nearly related to the urban or " W " strain of tropical typhus than to the rural or " K " strain. *W. Fletcher.*

Federated Malay States. **Annual Report of the Institute for Medical Research for the Year 1934** [Kingsbury (A. Neave), Director].—107 pp. 1935. Kuala Lumpur : Govt. Press.

Among items of special interest in this Report are :—

(1) Evidence that, in ordinary estate practice, a short course of quinine is as efficient as a course of atebrin and costs only a fifth of the price.

(2) The importance of *A. barbirostris* as a carrier in the Malay States.

(3) The demonstration that the intradermal inoculation of the virus of rural tropical typhus produces a primary lesion like that of Japanese river fever.

(4) The proof that urban tropical typhus is carried by fleas.

Dr. Richard Green continued his work on the relative value of quinine and atebrin in the treatment of labourers on rubber estates. The theoretical advantages emphasized in his earlier reports would apply mainly to groups of labourers who were members of a stable population residing in an area where opportunities for re-infection

with malaria parasites were few. He has now investigated the use of atebrin on rubber estates under essentially practical conditions, and has carried out a series of experiments in order to determine how the results of short curative courses of quinine, 20 grains a day for one week, compare with those of six-day courses of atebrin. He found that "the treatment of fever cases in the atebrin group cost about four times as much as the treatment of such cases in the quinine group. The general efficacy of treatment was found, however, to be similar in each group, *i.e.*, in the quinine group approximately the same results were obtained at about one-quarter of the cost . . . atebrin is used to its best advantages when 'mass' treatments consisting of curative doses are given for periods of 6 days to labourers on estates." These mass treatments are recommended once monthly during malarious seasons and every two months during comparatively non-malarious seasons.

Experiments made with the object of determining the shortest period within which anopheles are able to transmit malaria showed that most species fed readily two days after emergence from the pupa and that eight days later many of them were capable of transmitting malaria. The maximum duration of life, in the laboratory, of 14 different species of Malayan anopheles was from 36 to 66 days, and the average life of most species was about one month.

Mr. E. P. Hodgkin, the entomologist, continued the trapping of mosquitoes in human-baited traps. In the Report for 1933, it was mentioned that *A. barbirostris* had been found responsible for an outbreak of malaria in the town of Batu Gajah and, during 1934, it was found to be a carrier in the coastal districts.

Tropical Typhus and Japanese River Fever.—Drs. R. Lewthwaite and S. R. Savoor continued their work on these diseases. The following strains of virus are maintained in the laboratory :—

1. "Seerangayee" K, or rural tropical typhus, 92nd generation in guineapigs.
2. "Mannikam" W, or urban tropical typhus, 84th generation in guineapigs.
3. "Raub" (formerly "Wellington") Japanese river fever, 87th generation in rabbit's eyes.
4. "Kepong", Japanese river fever, established during the year.

Drs. Lewthwaite and Savoor have already demonstrated the identity of the viruses of rural typhus and Japanese river fever. The only difference between the two diseases is the absence of the initial ulcer in the first and its presence in the second. Experiments were made during 1934 to determine if the virus of rural tropical typhus would produce an initial ulcer resembling that seen in Japanese river fever, if it were inoculated intradermally. For this purpose, rabbits and monkeys were inoculated intradermally with the Seerangayee strain of rural typhus and also with the Raub strain of Japanese river fever. The results were the same in both cases ; a papule appeared at the site of inoculation which became a small circumscribed ulcer with a black necrotic centre and a surrounding red areola ; a leucopenia and a positive Weil-Felix reaction (*OXK* being agglutinated) occurred in both cases. These experiments confirm the identity of the viruses, and it is suggested that the difference between tropical typhus, in which there is no initial ulcer, and Japanese river fever, in which an ulcer is the characteristic feature, depends in nature on a difference in the route of inoculation of the virus ; in one it may be subcutaneous and in the other intracutaneous.

The experiments with the virus of Rocky Mountain fever, mentioned in last year's Report, were continued during 1934. They confirmed the finding that there was no cross immunity between this virus and that of rural tropical typhus ; but with reference to urban tropical typhus, it was found that though a past infection with this did not protect against Rocky Mountain fever, nevertheless an infection with Rocky Mountain fever did give some degree of protection against urban tropical typhus.

Experiments made with the ticks *Dermacentor andersoni* and *Rhipicephalus sanguineus*, the vectors of Rocky Mountain fever and fièvre boutonneuse, afforded no evidence that they could transmit, or even acquire, the viruses of either the rural or urban form of tropical typhus.

A series of experiments with rat-fleas (*X. cheopis*) and white rats infected with urban tropical typhus demonstrated that this flea becomes infected when it feeds on infected rats. Innumerable Rickettsia are found in the gut and it transmits the infection when it feeds on clean rats. " These experimental findings leave little doubt that, in nature, the rat-flea is a vector of urban typhus from rat to rat and from rat to man."

The preparation and use of antirabic vaccine was continued ; for human patients, 2 per cent. sheep's brain in 0·5 per cent. carbol saline ; for dogs 20 per cent. bullock's brain in 0·5 per cent. carbol saline. The mass inoculation of dogs in Kuala Lumpur has now been in force for 3 years in succession, and again no case of rabies has been reported.

Brilliant green has been used in some smallpox lymph stations to spray calves with the object of reducing the bacterial content of the lymph. This method was tried during the year at Kuala Lumpur but it was found to reduce the potency of the lymph without, to any great extent, reducing the number of organisms.

Other investigations included : typing of pneumococci, the colloidal paraffin reaction in the cerebrospinal fluid, the examination of the cerebrospinal fluid in leprosy, the Ascheim-Zondek test for pregnancy, the chloramine treatment of water and the testing of rat-virus.

In the Division of Chemistry, under Mr. R. W. Blair, the preparation of an extract of rice polishings for the prevention and treatment of beriberi has been continued. This extract, which is issued in the form of tablets or powder, was found to contain 100 international vitamin B 1 units per gram, or, weight for weight, about 4 times more than marmite. Considerable attention has been given to water supplies ; bacteriological and chemical examinations have been made regularly, and the raw waters of the majority of the water supplies have been examined spectrographically for the presence of mineral constituents.

W. Fletcher.

MAURITIUS. ANNUAL REPORT ON THE MEDICAL AND HEALTH DEPARTMENT 1st JANUARY TO 31st DECEMBER, 1934 [KIRK (J. Balfour), Director]. Appendix I. pp. 29–47.—**Annual Report of the Bacteriological Laboratory for the Year 1934** [ADAMS (A. R. D.), Senior Pathologist and Superintendent].

——. Appendix I.A. pp. 48–50.—**Annual Report of the Government Analyst for the Year 1934** [STOYLE (J. A. R.)].

Two reports are included in this, *viz.*, that of Dr. A. R. D. Adams on the work of the Bacteriological Laboratory and that of Mr. J. A. R.

Stoyle, the Government Analyst. The latter report, though of importance to the Island, calls for little comment. During the year 1,715 samples were dealt with, a 16 per cent. increase on the return of the previous year. The work was of a routine nature, comprising biochemical examinations for the Medical and Health Services, medico-legal investigations, analyses of milk and food, and work for the Police, Customs, and Public Works departments.

The work at the Bacteriological Laboratory may be divided into (1) Routine ; (2) Research. The former includes Kahn tests, Widal tests, preparation of vaccines, including the usual enterica group and human and bovine BCG, bacterial analyses of public and private water samples, etc. ; altogether 9,633 specimens were dealt with, of which 2,444 were pathological. Among the faecal specimens the commonest helminth ova found were those of *Trichuris trichiura* (593), those of hookworm next, but less than half (285) and ascaris third (246). The most frequent protozoal finding was *E. histolytica* (47). Water samples totalled 446 ; fortnightly examinations were made of 6–10 samples of water from various parts of the Mare-aux-Vacoas supply. The water is often turbid and odorous, due to the filters becoming charged with Beggiatoa.

Interesting cases of schistosomal salpingitis (*Sch. haematobium*) are reported and one other particularly noteworthy. An Indian boy of 14 years was very heavily infested with *S. haematobium*, as many as 1,500–2,500 ova being found per cc. of urine. He had a sharp attack of malaria ; *P. falciparum* was seen in his blood and quinine sulphate, 45 grains, was given for 3 days. The attack subsided and the ova of schistosomes practically disappeared, prolonged search revealing only a few and these damaged and non-viable. It is conjectured that the cure of the schistosomiasis was due to the high fever (105°F.) rather than to the quinine or that it was a mere coincidence.

Another interesting case was that of a man dying 12 hours after an operation for acute abdominal symptoms. At autopsy an Ascaris was observed protruding from a torn hepatic bile duct ; 7 specimens were found in the gall-bladder and 10 in the liver bile ducts.

Attention should also be called to the recording of two further cases of *sprue*, one an indigenous Creole.

Two important pieces of research were pursued : (1) On the local intermediate host of *Sch. haematobium* ; (2) On Trypanosome infection of stock.

As regards the former : Incrimination of *Bulinus* (*Pyrgophysa*) *forskali* is based on the following observations :—

" (i) *B.* (*P.*) *forskali* was the only snail of many species tested which exerted a definite attractive action on freshly-hatched miracidia.

" (ii) The miracidia were actually seen vigorously to attack specimens of this species of snail.

" (iii) Penetration was observed *in vivo* under experimental conditions.

" (iv) This was subsequently confirmed by fixation of snails after a short period of exposure to infestation, and section ; when it was seen that enormous numbers of miracidia had gained entrance into their bodies.

" (v) Developmental forms of the larval stages of the worms were readily found on dissection after about two weeks in every snail of this species exposed to infestation ; none were recovered from snails of other species.

" (vi) After a period of three weeks characteristic sporocysts were found in the liver glands, containing bifid-tailed cercariae true to type.

" (vii) Within twenty-eight days from initial exposure to infestation every snail so exposed was found on dissection to contain sporocysts with characteristic cercariae in large numbers, and at the end of this period usually a large number of cercariae were being emitted naturally from the affected molluscs.

" (viii) No other type of furcocercous cercaria has so far been found in any snails dissected at the laboratory, in spite of the fact that many hundreds have been dissected during the last ten years. ' Wild ' *forskali* obtained from the canals which we utilise for our material have not so far been found naturally infested, although a specific search on a large scale for naturally-infected snails has not yet been undertaken in places where there is a greater possibility of their acquiring the infection naturally."

During the early part of the year a survey of the distribution of *Bulinus forskali* in the Plaines Wilhems was undertaken. The whole course of the river and its tributaries afforded specimens of the snail, as did small streams in the neighbourhood of Port Louis. It apparently prefers fairly swift-running streams to still water ; hence, attempts to keep them alive in tanks at the laboratory were not successful. Experimental work with guineapigs has also failed ; perhaps the infection presented was not sufficiently heavy.

As regards the second investigation—trypanosomiasis of stock. This has been known for some time and preventive measures have included prohibition of importation of cattle from infected areas, quarantining of all imported stock for periods of observation, routine examination of the blood of cattle throughout the island, isolation and treatment of those found infected with surra and destruction of infected equines. For some years past occasional cases of trypanosomiasis have been noticed by planters among their horses and these animals survived and returned to work apparently in perfect health. These were probably cases of *T. vivax* infection, a fact borne out by the laboratory findings this year in specimens from Pamplemousses, Quatre Bornes, Candos, Highlands, Curepipe and the Mahebourg area.

Formerly, the trypanosome was believed to be *T. evansi* in each case, but some have proved to be *T. vivax*, so there are clearly two distinct infections in Mauritius—surra of Indian origin and n'gana from Africa. Of 17 cases reported 12 were infections by *T. vivax* and 5 by *T. evansi*. The main points on which the diagnosis of *T. vivax* rests are :—

" (i) The trypanosomes were recovered from several locally-bred oxen which were not very obviously ill ; they had been found to be infected on casual routine examination of the peripheral blood during the work of the veterinary section of the Agricultural Department.

" (ii) These trypanosomes repeatedly and consistently failed to infect any one of a very large number of small laboratory animals, including dogs, white mice, guinea-pigs, rabbits, and monkeys (*Macacus cynomolgus*) when injected in large numbers intraperitoneally. All these animals were found to be very susceptible to infection with the local strains of *T. evansi*, which were invariably fatal to them.

" (iii) The parasites, however, were readily inoculable into cattle and goats, where the resultant infections ran a prolonged course.

" (iv) Morphologically, and in their movements when alive, they conformed to the characters of the *vivax* group of African trypanosomes.

" (v) Clinically the type of infection resulting from experimental inoculation was quite unlike that produced by similar inoculation with the local *T. evansi*. Parasites were never present in the peripheral blood of experimentally-infected animals in very large numbers ; they regularly disappeared entirely, as judged by prolonged daily examinations of wet-films, for days or even weeks at a time ; the animals were, seemingly,

not seriously incommoded by their infections after the first week or so following the inoculation, when there was a certain degree of irregular fever and diarrhoea; and, in the case of at least two goats and two oxen, trypanosomes became regularly more difficult to find over a period of four or five months until, finally, they have not been recovered for over three months, and the animals appear to have recovered from the infection entirely.

"(vi) Full courses of arsenical medication, repeated in some cases on two or three occasions, entirely failed to eradicate infection with this type of trypanosome, while similar courses have been efficacious in local *T. evansi* infections.

"(vii) Opportunity for the introduction of some of the less virulent African trypanosomes into Mauritius must have been fairly frequent over a period of many years, as South Africa is the usual source of pedigree and higher-grade stock for this island."

It is of fundamental importance to determine the distribution and method of spread of these infections, economically as well as scientifically, for the fact that one African trypanosome has been able to establish itself in the island in the absence of Glossina makes it possible that other African trypanosomes may have done the same.

During the year the following have been published by the Laboratory staff:—

Adams, A. R. D. & Webb, Lewis. (1934). A Survey of the Protozoal and Helminthic Infestation-Rates of the Male Prison and Reformatory Inmates of Beau Bassin Prison, Mauritius.—*Ann. Trop. Med. & Parasit.* Vol. 28. p. 25.

Adams, A. R. D. (1934). Studies on Bilharzia in Mauritius. I. The Experimental Infection of *Bulinus* (*Pyrgophysa*) *forskali* with *Schistosoma haematobium*.—*Ibid.* Vol. 28. p. 195. *H. H. S.*

Kenya Colony and Protectorate. **Medical Research Laboratory Annual Report 1934** [Cormack (R. P.), Senior Bacteriologist].—29 pp. 1935 Nairobi: Govt. Printer.

Approval has been obtained for the separation of the Government Analyst's Section from the Medical Research Laboratory to date from January 1st, 1935. The Section will, however, still be housed in the Laboratory.

Routine work of the Bacteriological and Medical Biological Sections has been transferred very largely to the care of Laboratory Assistants, and the ordinary management of the Laboratory into the hands of a Laboratory Superintendent. Owing to an epidemic of smallpox, of a virulent type, early in the year, heavy demands were made by the Medical Department for vaccine lymph. These were effectively met. The use of Dr. de Smidt's pneumococcal vaccines on mines in the Kakamega district may afford an interesting comparison with similar work in South Africa. Of the local types of pneumococci which can be recognized among Group IV strains, the three types most numerous among those reported have been the local D, L and J types, which have been found to correspond with Miss Cooper's Types VIII, V and VII respectively. Of 190 cultures of Pneumococci typed 28·4 per cent. were found to belong to Type I, 7·9 to Type II, and 9·5 per cent. to Type III. In the previous year the percentage of Type I was 17·2.

Note is made of antimalarial work carried out in eight specified areas, with special mention of the Kakamega district. The work of trapping and of otherwise reducing tsetse flies in defined areas has been continued and is affording promising results. In co-operation with the

Veterinary Research Department Staff, experiments have been initiated to investigate the possible transmission of bovine haemorrhagic septicaemia by the agency of fleas. The results of the first two experiments were suggestive of successful transmission to white mice through *Ctenocephalus felis strongylus*, Jord. Further work is planned. Particular attention has been paid to rat destruction by " Cyanogas " fumigation, to be used by native labour, in connexion with the hyperendemic plague area of Keruguya. Tests of fumigation by " Celophite Units " of steamers and trains have led to the recommendation of their adoption, whilst preliminary trial of " Cymag " has afforded promising results with a view to a more economical fumigant for native huts.

A biochemical analysis was completed of a series of eighty-two vegetable foodstuffs, and a series of milk samples, taken at fortnightly intervals throughout lactation of three native cows, were examined among other research of the Biochemical Section. *P. H. Martin.*

PALESTINE, DEPARTMENT OF HEALTH. ANNUAL REPORT FOR THE YEAR 1934. [**Section VII. Laboratory Services** pp. 86–109.]

There was a further marked increase in the number of routine investigations and in the production of biological products during the year. Bacteriological routine specimens increased by 40 per cent. to 200,000 ; the Chemical division showed a rapid expansion of the biochemical branch ; Entomological activity has been limited since the abolition in 1931 of the post of Medical Entomologist and identification of insects has been carried out by ordinary laboratory officers.

It is noted that bacteriological and chemical institutes, maintained by private funds, have greatly increased in number in the principal cities, and that such institutes have rendered considerable service.

Owing to extensive issues of vaccine lymph in 1933, increased production was called for in 1934 and this had to be unusually prolonged. A poor quality of calf made matters worse, until a new lessor provided animals which gave an average yield of 59 grams of pulp compared with the earlier average of 30·3 grams.

Antirabic vaccine, a modification of Semple's, is made in the Central Laboratories, while treatment is decentralized. Thus over 90 per cent. of bitten persons were able to attend at 31 centres within a week of being bitten. Although there has only been a negligible response to the facilities offered by way of canine prophylactic vaccination, the course of which is three doses each of 2 cc. on successive days, a very large number of ownerless dogs and cats, and wild animals were destroyed. Greatly improved legislation for control is now provided by the Rabies Ordinance of 1934.

Further investigation has been carried out in the agglutinin response to antienterica vaccination. The results, as already published, suggest that freshly prepared vaccine, without the addition of preservative, is to be preferred. The Central Laboratories, at the request of the Colonial Office, provided accommodation and gave assistance to a research worker in enterica serotherapy.

From 55 human specimens the human type of *M. tuberculosis* was isolated 9 times, and bovine not at all. Five veterinary specimens out of eight yielded the bovine type.

Diphtheria in Palestine seems in the main to run a mild clinical course ; " gravis," " mitis," and one " intermediate " strains have been isolated.

Further evidence has been accumulating that arachis oil (pressed locally from imported nuts) is the chief adulterant of and substitute for indigenous oils.

In a special investigation of the causes of the high acidity (3–5 per cent.) of local unrectified olive oil, which acidity restricts its foreign market, it has been found that, by avoiding fermentation prior to pressing, local olives pressed in the laboratory can give an oil having less than 0·5 per cent. acidity. Continuation of this work, initiated by the Department of Agriculture, is planned during the next olive harvest.

The Chemical Division has also been investigating the tolerance of citrus for salinity of irrigation water. A preliminary survey in the Jaffa area points to a tolerance up to 250 parts per million, subject to good drainage, while 250 to 350 parts would be considered risky and any higher figure would indicate danger to a projected plantation. Jordan water, between the Lake of Tiberias and Jericho has shown a salinity of 300–400 parts per million, which it derives from the Lake.

Further work is also in progress at the request of the Research Department, Woolwich, on the corrosion of aluminium alloys by Palestine water. *P. H. Martin.*

Lhérisson (Camille). **Diseases of the Peasants of Haiti.**—*Amer. Jl. Public Health.* 1935. Aug. Vol. 25. No. 8. pp. 924–929. [22 refs.]

The Public Health Service in Haiti was organized in 1919 and has had to wage an uphill fight against heavy odds. Though much remains to do, much has been accomplished, and dispensaries have been established throughout the Republic. The prevalence of disease varies in different parts of the island ; clothing, mode of living, diet, geographical situation, mountain or lowland district, all exert an influence. *Trauma* is frequent among the peasants and the wounds becoming infected develop into extensive ulcers which not infrequently result in death from tetanus. The custom of children and young women carrying heavy loads leads to pelvic deformity and difficult labour, and early resumption of work on the part of the mothers entails neglect and wrong feeding of the infants resulting in high infant mortality. Diarrhoea and *dysentery* are rife, the amoebic form in the north and the bacillary fairly general, an epidemic type known as "colerin", which affects annually about 25 per cent. of the rural population, being believed to be due to *Bact. dysenteriae* Flexner.

Ascaris, hookworm (*Necator americanus*), trichuris, oxyuris, strongyloides and taenia are common ; among 4,439 examined in the Carrefour, Rivière Froide and Dégand districts, 30 per cent. were infested with Necator, 43 with Ascaris and 58 per cent. with trichuris. *Neoplasms* are unexpectedly frequent. "Malignant tumours cause an approximate death rate of 5 per cent. in the hospitals of the country." *Goitre* is common in the mountain districts and pinta in the plains. *Tuberculosis* is rife and rapidly fatal ; it is the most important cause of death in hospital, accounting for 30 per cent. of the total deaths.

Malaria is common ; tertian and double tertian are called "acclimatization fevers." Among the 4,439 persons examined in a Rockefeller Mission survey 67 per cent. showed malaria parasites in their blood and of 11,000 going from the north and north-east to work in Cuba for the United Fruit Company 23·5 per cent. were infected. *Leprosy* is a menace and, there being no leprosarium in Haiti, the patients remain,

many of them, untreated and at large. *Yaws* is the commonest of all diseases ; among 2,564 persons examined by the Rockefeller Mission in the neighbourhood of Port-au-Prince 78 per cent. were infected, and among 3,289 cases of yaws 61·1 per cent. were children under 10 years and in the Jacmel region alone in the 12 months May 1925–April 1926, 167,267 cases of this disease were treated. *H. H. S.*

Smith (E. C.). **Hodgkin's Disease in Natives of Nigeria. Results of the Biological Test.**—*Lancet.* 1935. Oct. 19. pp. 874–877. With 4 figs.

This article is an account of a study of 9 cases of lymphadenoma met with in Africans in Nigeria. In three the tissues were sent without history to the author. Of the other six, 5 were males aged 10, 14, 25 and 35 years [the age of the fifth is not given], and one an adult female. Three had general enlargement, one had cervical adenoma only, another cervical and axillary, another inguinal and deep abdominal. The duration of disease, where this could be ascertained, varied from 6 months to 3 years. A gland being removed was examined for histological changes, for bacteriological associations and for Gordon's biological test in 3 cases. The histological changes were typical and are illustrated by photomicrographs. Bacterial investigations were undertaken to exclude infection with *Myco. tuberculosis* and to determine whether diphtheroid organisms, as reported by Bunting and Yates, were present. Guineapig inoculation yielded no evidence of tuberculosis. Anaerobic cultures led to the growth of the Bunting and Yates' organism, *C. hodgkini*, together with Gram-positive cocci and Gram-negative motile bacteria. The first of these was inoculated subcutaneously or intravenously into guineapigs, rabbits and monkeys (*M. rhesus*), but with negative results (one monkey showed glandular enlargement, histologically a non-specific inflammatory reaction). In two of the three subjected to Gordon's biological test, typical-positive results were obtained and the rabbits showed well-marked paralytic symptoms from the 4th to 7th day after inoculation. In the third case the result was doubtful. [In view of the presence of this disease among natives and, it would appear, not very uncommonly, if the author was able to study 9 cases, perhaps some of those with symptoms of relapsing fever in whom the spirochaete is not found may be instances of the Pel-Ebstein form of lymphadenoma.] *H. H. S.*

Franchini (G.). Condizioni igienico-sanitarie delle nostre Colonie dell' A.O. [**Sanitary Conditions in Italy's African Colonies.**]—*Riforma Med.* 1935. Sept. 21. Vol. 51. No. 38. pp. 1436, 1439–1440.

Very little is said in this article regarding the prevailing conditions of hygiene and sanitation in the Italian Colonies in East Africa. After a few remarks on the geography of them and on the natural waters which are not potable owing to the high saline content, the author passes on to give general advice on rendering water potable, on the questions of food, clothing, dwelling-houses, and personal hygiene and the avoidance of disease. The terminal paragraphs are occupied with a list of the diseases which may be met with ; notably malaria, leprosy, ankylostomiasis, schistosomiasis, relapsing fever, yaws, and various mycotic infections. *H. H. S.*

LEDENTU (G.). Les maladies transmissibles observées dans les colonies françaises et territoires sous mandat pendant l'année 1933. [**Transmissible Diseases in the French Colonies and Mandated Territories in 1933.**]—*Ann. de Méd. et de Pharm. Colon.* 1935. July–Aug.–Sept. Vol. 33. No. 3. pp. 552–816.

Attention is drawn to this report which cannot be abstracted. It is analogous to, though on a smaller scale, the Supplement of the *Tropical Diseases Bulletin*. Whereas in the latter the medical and sanitary reports of each of the British Colonies, Dependencies, and Protectorates is abstracted and the advances in sanitation, the prevalence of disease, measures to combat them, and research work are detailed, in the former the diseases are taken up seriatim and their prevalence in different colonies, etc., recorded. They are divided into four main groups: (1) Infections such as plague, cholera, yellow fever, smallpox and typhus; (2) Endemo-epidemic, such as malaria, trypanosomiasis, the dysenteries, relapsing fever, dengue, filariasis, yaws, beriberi, etc.; (3) Infections common to temperate and tropical climates—pneumonias, influenza, cerebrospinal fever, enteric fever, scarlet fever, diphtheria, chickenpox, mumps, rabies, etc., including also trachoma, and (4) "Social" diseases—tuberculosis, venereal diseases, leprosy, alcoholism and cancer. The whole will be useful for reference and comparison. *H. H. S.*

UCHIMURA (Y.). **"Imu": a Malady of the Ainu.**—*Lancet.* 1935. June 1. pp. 1272–1273.

This description of "imu" would serve equally well for a description of the malady known as "latah" in Malaya.

In the condition known as "imu" the patient is liable to psychomotor attacks which are precipitated by some emotional shock, such as a sudden unexpected sound or the mention of something which is regarded with horror, such as a snake or a toad. The condition is almost entirely restricted to women who have passed middle age and who appear to be rather above the average in intelligence. Sometimes an attack consists of a sudden outburst of violence in a woman who, up to that moment, appeared quite normal; she behaves as if possessed by rage and terror, attacking everything in sight with hands, sticks, stones and weapons. The attack lasts only a few minutes and then the patient becomes normal again. In a less violent form, when the patient is startled by some word, sight or noise she "may appear suddenly bemused and will continue for a time to echo everything that is said to her. "One," you say to her and "one" the patient echoes; "you fool," and "you fool" is the answer; "bow," and she returns "bow-wow."

"Similarly, actions are copied; clapping the hands, raising the arms . . . all elicit similar acts on the part of the patient. . . . When in this bemused condition patients are highly susceptible to suggestion . . . and if placed in a given position will remain cataleptically in that exact posture until released by permission. . . . If ordered to strike a given person, that person will be relentlessly pursued until the blow has been given . . . to plunge into freezing water in the depth of winter or to bathe in boiling water offers no deterrent . . . In some patients the negative aspect of these three forms of reaction appears equally clearly. Instead of repeating what is said to them they answer with a direct opposite; instead of imitating movements they make one, the significance of which is exactly the reverse; instead of obeying suggestions they act in a directly contrary

manner. . . . Similar maladies are to be found amongst the natives of Malay, the Yakuts of Siberia, and the American Indians, other races whose cultural level is recognized as being lower than that of the average."

The spiritual life of the Ainu people is very primitive and, as with all such races, their degree of suggestibility is high. The women are by custom completely submissive to the men. The author regards both hysteria and imu as being due to repressed resentment, and the resentment which activates the imu patient as being occasioned by the subordinate place to which she is relegated by Ainu tradition. The word "imu" means "severe shock." The condition itself is generally called "imu-futchi" or "imu-bakko," each of these suffixes meaning "old woman." Sometimes it is called "tokoni-bakko," "tokoni" being the native name of a dreaded viper, the mere mention of whose name brings on an attack. *W. Fletcher.*

Brown (Arthur A. Forbes). **The Ulcer Syndrome in Tropical Africa.**—*Jl. Trop. Med. & Hyg.* 1935. Vol. 38. July 1, 15, Aug. 1, 15 & Sept. 2. pp. 157–161; 170–176; 187–193; 201–206; 215–220. [43 refs.]

This is a very good article, clearly the outcome of much careful study. The author allocates ulcers to three main groups, but the grouping is on an arbitrary plan [or want of plan] for the grouping is not a classification. Group A includes ulcers resulting from trauma, scabies, etc., and spirochaetal such as yaws. Group B is the phagedaenic [spelt phagoedenic throughout the article]; Group C comprises ulcers clinically identical with Group B but resulting from trauma and later becoming phagedaenic. This, it will be seen, is not a grouping, since any ulcer may become phagedaenic.

The bacteriological aspect is dealt with and analyses made of over 400 cases. Almost 9 out of 10 of the ulcers with *B. fusiformis* are phagedaenic whether associated with spirilla or not. The question of sex and tribal incidence is next discussed and then the coexistence of parasitic affections, malarial, or helminthic. Treatment is considered in some detail and results of careful blood analyses as regards serum Ca and P are tabulated. About one-third of those with phagedaenic ulcers have a low Ca level and the beneficial effect of administration of calcium and parathyroid is noted. Diet is a subject which cannot be ignored in connexion with the aetiology of ulcers in tropical countries and due prominence is given to it here, more than half the article being devoted to this side of the subject. The following are the author's conclusions :—

"(1) The exact relationship of *Bacillus fusiformis* and Spironema to ulcus tropicum remains unproved, but the evidence suggests that these organisms are causal.

. . . . . .

"(3) Ulcer is a class disease, and is not found among the better classes or in institutions.

"(4) Ulcer seems to be closely related to calcium and/or parathyroid deficiency, and may be a manifestation of latent tetany.

"(5) The calcium deficiency does not appear to be *in* the diet, but seems to be *due* to the diet, faulty absorption probably being a factor.

"(6) The exact connection of the parathyroid with the condition is not clear, but the gland appears to have factors controlling calcium regulation and skin vitality and resistance, and it may be affected by dietary deficiency.

" (7) One of the most important considerations is the quality of the protein in the diet. Ulcers are much more common in vegetarians than in those who include animal substance in their diet. It is essential that a fair proportion of the protein should be of animal origin, as even nuts and beans have the disadvantage of being covered with resistant fibre.

" (8) The vegetarian diet, as consumed by the African native, is much too bulky. Digestion of protein, fat and calcium may be greatly interfered with. The most important prophylactic measure, which would go far to prevent the appearance of the ulcer syndrome, is to include meat, eggs, fish, or fowl in the diet, and to reduce the amount of vegetable matter; the consumption of three smaller meals instead of two larger, would favour optimal utilization."

This article would form an excellent basis for a monograph on the nature, causation, pathology and treatment of ulcers in the tropics [not a " syndrome," which means a set of concurrent symptoms in disease.] *H. H. S.*

Fairley (N. Hamilton) & Mackie (F. P.). **Case of Streptothrical Ulceration of the Colon with Portal and Systemic Pyaemia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. July 31. Vol. 29. No. 2. pp. 151–156. With 3 figs. on 1 plate & 1 chart.

This is an account of a case of actinomycosis in a man of 60 who had returned to England, after a long residence in China, about two months before the onset of his illness.

The disease apparently originated in the " colon " but became generalized and ended fatally after 94 days. The clinical features suggested " liver abscess," but an exploratory operation failed to reveal any pus. About six weeks after this operation an abscess appeared in the left forearm, and from the pus of this a " streptothrix " was cultivated. Five days later a superficial abscess on the right leg was opened and the pus from this also yielded a " streptothrix." Three days later the patient died.

The macroscopic and microscopic appearances of the tissues, post-mortem, are described and a brief account is given of the fungus which was feebly Gram-positive, not acid-fast and presented the general morphological characters of Actinomyces. It grew aerobically, did not liquefy gelatine and caused " no change in lactose, glucose, mannite, dulcite, sucrose, maltose, raffinose, galactose." Rabbits, guineapigs and white mice inoculated by the subcutaneous, intraperitoneal or intravenous routes remained healthy and the fungus was not recovered from their viscera. The Actinomyces is thought to belong to Group I of Ørskov's classification. *J. T. Duncan.*

Niño (Flavio L.). Blastomicosis humana generalizada por Cryptococcus (n. sp.). (Estudio clinico, parasitológico, anatomopatológico y experimental. [**Generalized Human Blastomycosis caused by a New Species of Cryptococcus.**]—*Universidad Buenos Aires : Misión de Estudios de Patología Regional Argentina Jujuy.* 1934. Monografia No. 3. 164 pp. With 129 figs., 13 plates & 7 charts. [110 refs.]

This could probably claim to be one of the most detailed records of a single case in the literature. The monograph gives an account of the clinical state of a man of 60 years who died from an infection with cryptococcus, and of the investigations connected therewith. The

patient had suffered for 14 years with an ulcerated condition of the face with scab-formation. About a month before death similar lesions developed on the back. He had shown evidence of urinary disturbance ; abscess of the prostate and blastomycotic involvement also of the renal pelvis were found to account for this ; dyspepsia was present due to gastritis of blastomycotic origin it was supposed, and, latterly, meningeal symptoms, and, post-mortem, oedematous infiltration of the pia was found, and in the right cerebral hemisphere, deep down near the lenticular nucleus, a softened mass the size of a 5 centavo piece. The lungs were also involved ; there was pus in the bronchioles of the right lung and a cavity in the left.

The author describes the fungus isolated from the lesions and experimental work carried out with cultures of it. It proved to be a Blastomycete of the genus Cryptococcus, but of a species not previously described and the author has named it *C. psychrophylicus* " on account of its most striking biological characteristic of growing at low temperatures only." (ψυχρός=cold). Growth was best at 22–25°C., was good at 10°C., but arrested at 37°C. Guineapigs, white rats and mice were very susceptible to experimental inoculation and presented lesions similar to those in the human case ; the dog and rabbit were less susceptible, while the monkey, cat and pigeon were refractory. In susceptible animals the course of disease was slow but invariably led to death. Histologically, there were produced granulomata with abundant giant-cell formation and at the same time histolysis with necrosis and abscess. Disssemination occurred probably by the blood stream. The value of the work is much enhanced by the large number (129) photographs and photomicrographs depicting the histological changes set up and by 13 beautifully reproduced coloured plates. *H. H. S.*

Mackinnon (J. E.). Estudo del primer caso uruguayo de cromoblastomicosis y ' revista critica ' sobre la enfermedad. [**A Study of the First Uruguayan Case of Chromoblastomycosis and a ' Critical Review ' of the Disease.**]—*Arch. Urug. Med.* 1934. Vol. 2. pp. 201–226. With 8 figs. [Summarized in *Rev. Applied Mycology*. 1935. Aug. Vol. 14. Pt. 8. p. 509.]

" Clinical, morphological, and cultural details are given of the first Uruguayan case of chromoblastomycosis due to *Phialophora verrucosa* in a white native of the country. The lesions on the patient's right hand resembled those of sporotrichosis from a histopathological point of view. The disorder described by Montpellier and Catanei from North Africa as due to *Hormodendron algeriensis* is considered to be a form of chromoblastomycosis, which may also be induced by *Trichosporium pedrosoi*. So far the known distribution of chromoblastomycosis is as follows : twenty-one cases in Brazil and one each in Paraguay and Porto Rico (*T. pedrosoi*) ; two in the United States and the present one in Uruguay (*P. verrucosa*) ; and one in North Africa (*H. algeriensis*). The disease has further been reported from Costa Rica, Russia, and East Africa (one case each) but without any definite attribution."

Carrión (A. L.) & Emmons (C. W.). **A Spore Form Common to Three Etiologic Agents of Chromoblastomycosis.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1935. Sept. Vol. 11. No. 1. pp. 114–115. [Spanish version pp. 116–117.]

Three fungi giving characteristically different growths on culture are known to cause blastomycosis, *viz.*, *Phialophora verrucosa* whose

" small egg-shaped spores are budded out successively in the cup-like mouth of a flask-shaped conidiophore " ; *Hormodendrum pedrosoi* with larger oval spores " in branching conidial chains on simple or branched conidiophores," and *H. compactum* with " subspherical spores, separated by wide septa . . . borne in branching conidial chains on simple or branched conidiophores."

In the tissues, however, these differences are not distinguishable and on account of this fact a close interrelationship has been suspected. The authors have recently examined 6 strains of the second of those mentioned (*H. pedrosoi*), 4 Porto Rican and 2 South American, and one strain of *H. compactum* and found spores of the Phialophora type, though in smaller numbers than the characteristic forms. The discovery of a spore form common to all three affords further evidence of the hitherto suspected relationship. A paper with more detail is to be published. *H. H. S.*

Martin (Donald S.). **Complement-Fixation in Blastomycosis.**—*Jl. Infect. Dis.* 1935. Nov.–Dec. Vol. 57. No. 3. pp. 291–295.

The antigen used for the C.F. test was a suspension in salt solution of the organisms grown at 37°C. on beef-infusion pH 7·4 blood-agar slants. The patient's serum was inactivated at 56°C. for 15 minutes and the test carried out as for the W.R. Five strains of Blastomycetes isolated from the same number of patients were used. In three patients with generalized infection the test was positive, in one negative. Sera from 78 others put up as controls were all negative and two of the sera positive for Blastomycetes were negative for Sporotrichum, Monilia, Coccidioides, Mycoderma and Histoplasma. No correlation was observed between the presence of complement-fixing antibodies and the patient's clinical state. It is concluded that the test is of great positive value, " a positive . . . with a 1–4 dilution of the patient's serum is diagnostic ", but a negative test does not exclude infection with Blastomycetes. *H. H. S.*

Kitabatake (E.) & Liu (K. P.). **A Case of Pneumonomycosis aspergillina.**—*Jl. Oriental Med.* 1935. Vol. 22. No. 3. [In Japanese pp. 497–505. With 1 plate. English summary p. 43.] [Summarized in *Rev. Applied Mycology*. 1935. Aug. Vol. 14. Pt. 8. p. 510.]

" An undetermined species of *Aspergillus* was found to be responsible for necrosis of the lung parenchyma in a 23-year old male native of Manchukuo, this being apparently the first record of pneumomycosis in the region under observation or in Japan."

Castellani (Aldo) & Standring (Thomas). A Case of Bronchomycosis due to *Monilia tropicalis*.—*Jl. Trop. Med. & Hyg.* 1935. Oct. 1. Vol. 38. No. 19. pp. 244–245.

Marque (E.) & Raynal (J.). Mélioidose à forme septicémique suraigue. [**Hyperacute Septicaemic Melioidosis.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Nov. Vol. 13. No. 9. pp. 1259–1263.

A remarkable and unusual case. A woman of 48 years was taking her two daughters, who were suffering from typhoid fever, in a motor car to

hospital. An accident occurred and the car was thrown down an embankment into a pond. The woman was rescued after submersion " for a certain time " and taken to hospital [the fate of the daughters is not mentioned]. There she was found to have contused wounds of both legs, bruises of the chest and signs of water in the lungs. The pulse was barely perceptible and she was expectorating blood and blood-stained froth. Next day she lay in a state of coma-vigil, but though there was some respiratory difficulty, there was no further haemoptysis. Dulness was present at the base and some moist râles. The day after she regained consciousness and seemed much better, but within 24 hours the temperature rose to 39·9°C., the lung signs were better in the right, aggravated in the left, and there was headache and rapid pulse (135 per minute). Thirty-six hours later the temperature was 40·7°C., pulse 140, and there was insomnia with continuous delirium. Next day the general condition was worse ; temperature rose further, the pulse became uncountable ; a sample of blood was taken for culture and sent to the Pasteur Institute and death occurred 8 days after admission to hospital. Autopsy was not performed, but report came from the laboratory that *Pf. whitmori* had been identified from the culture.

The important question was the source of infection. One possibility was the patient was already infected before the accident occurred and that the immersion and pulmonary complication had precipitated the illness (but except for high arterial tension and some deafness from otosclerosis she was in good health prior to the accident). The other possibility was that the immersion and swallowing of water polluted by rats had been the cause ; rats have been incriminated as a reservoir of this organism. *H. H. S.*

Vaucel (M.) & Hasle (G.). Un cas de septicémie à bacille de Whitmore. [**Septicaemia due to** *Pf. whitmori*.]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Nov. Vol. 13. No. 9. pp. 1256–1258.

A soldier of the Tonking tirailleurs was admitted to hospital complaining of headache and generalized pain and giving a history of a week's fever. His face was congested and breathing dyspnoeic, and there were disseminated rhonchi and basal râles ; the liver was slightly enlarged but not painful. Six days later jaundice was observed, the fever remained about 40°C. and a blood culture was attempted. Widal and Weil-Felix reactions with serum were negative. Death occurred a week after admission. The haemoculture gave a growth of *Pf. whitmori*, confirmed by animal inoculation. At autopsy, the chief lesions were an abscess as large as a pigeon's egg at the lower pole of the right kidney and small miliary abscesses in a corresponding situation of the left ; the spleen and liver were congested and a little enlarged. Apart from congestion and " small superficial iridescent patches " in the left lung, these viscera showed little. The source whence the infection was contracted was not discovered. *H. H. S.*

Bezemer (F.). Melioidosis op Celebes. [**Melioidosis in Celebes.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Sept. 3. Vol. 75. No. 18. pp. 1577–1579. English summary (2 lines).

A Mandarese (Celebes) woman of 25 years came under the care of the author. She was suffering from a fistulous abscess of the right

buttock. From the pus *Pf. whitmori* was grown and intraperitoneal inoculation into guineapigs caused death and from the organs the bacterium was again recovered.

This is said to be the fourth case recorded in the Dutch East Indies [see this *Bulletin*, 1934, Vol. 31, p. 344]. *H. H. S.*

i. Castellani (Aldo). **A Note on a Peculiar Febrile Hepato-Splenomegaly with Arthritis.**—*Jl. Trop. Med. & Hyg.* 1935. Sept. 16. Vol. 38. No. 18. pp. 229–230. With 1 chart.

ii. ——. **The Diagnosis of Hepato-Splenomegalies.**—*Ibid.* pp. 230–232.

i. The disease described is characterized by gradual onset of malaise and joint pains with asthenia. The temperature is raised, of an irregularly intermittent or remittent type or with a chart resembling that of undulant fever ; rigors are not usual. The spleen and liver are both hard and enlarged, extending even to the level of the umbilicus ; [which is the first to enlarge is not stated ; perhaps cases have not been seen early enough for this to be determined]. There is no jaundice. One or more joints, large or small, are swollen and painful but not as a rule reddened. There are no special blood changes, no enlargement of lymph nodes. Though there may be periods of amelioration the course is progressive ; one patient died after an illness of 14 months.

The causation is at present unknown, investigations so far have yielded entirely negative results ; Wassermann and Widal tests against the enterica and Brucella groups all negative. No treatment appears to affect the course of the disease.

The author has seen three cases ; perhaps more will be met with now that attention has been drawn to it, for its distribution, if sparse, is widespread ; two were seen in South Europe and one in America.

ii. This article mentions the various conditions in which great enlargement of liver and spleen occur. They are divided into two main groups, those with fever (20 in number) and those without (17 more) and the chief characteristic points of each are briefly referred to.

H. H. S.

i. Manuwa (S. L. A.). **Notes on Some Cases of Interest.**—*West African Med. Jl.* 1935. Jan. Vol. 8. No. 3. pp. 15–17. With 7 figs. on 4 plates.

ii. ——. **Lymphostatic Verrucosis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Nov. 25. Vol. 29. No. 3. pp. 289–290. With 2 figs. on 1 plate.

Of the four cases recorded in (i), attention may be directed to two as of particular interest. One was a case of Lymphostatic verrucosis, a condition bearing superficial resemblance to Mossy Foot, the description of which is enhanced by two excellent illustrations [see also this *Bulletin*, 1935, Vol. 32, p. 182]. This case is also described in (ii). The other was a case of Porocephalosis. Human infection with Porocephalus is not so uncommon as the author states, but its pathogenicity has been doubted. The subject in this instance was an Ibo male, about 30 years old, who was suddenly attacked with vomiting, abdominal pain and distension. He died four hours later and the acuteness of the symptoms and the rapidly fatal issue were somewhat naturally ascribed to poisoning of some kind. At autopsy some 20 or more nymphs of

Porocephalus were found in the radicles of the hepatic vein, others were attached to the mesentery. *Schistosoma haematobium* was present in the bladder; the spleen was fibrotic. Snake-eating is common in the district. *H. H. S.*

Journal of the Royal Army Medical Corps. 1935. Nov. Vol. 65. No. 5. Facing p. 324. **The Haemorrhagic Syndromes.**

This is an editorial giving in the form of a table the distinctive points of the morbid conditions associated with haemorrhage. Many practitioners, in fact we may confess without shame that at some time or other, even late in our medical career, we all have found difficulty in distinguishing purpura simplex, from Schönlein's or Henoch's purpura or from the numerous symptomatic purpuras. In this table, they are divided into two main groups of primary diatheses and secondary or symptomatic purpuras; the former again subdivided into haemorrhagic (purpura simplex and essential thrombopenia or Werlhof's disease), allergic (Schönlein's and Henoch's types of purpura) and "haemophilic" (haemophilia and haemogenia) and under each the particulars are given as regards characters of exudate, the cells of the blood, the coagulation time and bleeding time, the age and sex of patients, the treatment and prognosis. In truth, a very present help in time of trouble. *H. H. S.*

Macias y Macias (Francisco). Otro caso de otomiasis por "*Wohlfahrtia magnifica*" (Schiner, 1862). [**Otomyiasis due to** *Wohlfahrtia magnifica*.]—*Medicina Países Cálidos.* Madrid. 1935. Nov. Vol. 8. No. 11. pp. 538–541. [11 refs.] French summary (4 lines).

W. magnifica usually deposits its larvae in decomposing animal matter, but not infrequently on ulcers and infected wounds and in the natural orifices of man and animals—in man the nose, ear and mouth and on the eyes. The diptera lives in the open and hardly ever enters dwellings. The case here recorded is that of a backward child of five years, with a discharge from one ear. There had been a little pain in the ear, but this became suddenly intensified and prevented all sleep. Examination discovered larvae (three were extracted) which proved to be those of *W. magnifica*. *H. H. S.*

Allan (Joyce). **Poisonous Shellfish.**—*Med. Jl. Australia.* 1935. Oct. 19. 22nd Year. Vol. 2. No. 16. pp. 554–555. With 6 figs.

The subject of this interesting paper is poisoning resulting from the *bite* of certain shellfish. The text of the discourse is a case which was reported from Queensland, the patient being bitten at Hayman Island and dying before reaching hospital on the mainland. Such cases are not uncommon in the South Pacific Islands, in New Guinea, New Hebrides, New Caledonia, Tonga, Samoa, Fiji, New Britain, the Carolines, the Society, Sandwich, and Loyalty Islands. The shellfish are Conus species, with brightly coloured shells. Five at least are known: *Conus tulipa, C. marmoreus, C. geographus, C. textile* [? *textilis*] and *C. aulicus.*

The fish have a long tubular proboscis which can be protruded beyond the shell and opening into it is a sac containing two rows of hollow teeth. These penetrate the hand, for example, and the poison which is at the base of the teeth is injected into the bite. The symptoms after the initial prick are acute pain, swelling, local numbness and spreading paralysis. Speech becomes thick and indistinct, the sight is dim and a sensation of " pins and needles " extends all over the body. " Sore eyes " is a troublesome symptom and may be the last to clear. There may be early drowsiness deepening to coma and death.

The natives know of the danger of these bites and make small incisions round the site to cause free blood flow. *H. H. S.*

TALUKDER (M.). **A Case of Aconite Poisoning treated by Hypertonic Saline by the Intravenous Route.**—*Indian Med. Gaz.* 1935. Nov. Vol. 70. No. 11. p. 628.

Poisoning by aconite is not uncommon in India and this case is recorded because of the recovery which followed an unusual form of treatment after all the usual methods had failed and the patient appeared to be *in extremis*.

The patient by mistake swallowed about an ounce of A B C liniment (aconite, belladonna and chloroform ; and lin. aconiti contains 0·2 per cent. alkaloid). The stomach was washed out with solution of potassium permanganate as soon as possible, but all the symptoms of poisoning by aconite appeared and were so severe as to mask those of belladonna or chloroform. In spite of a second lavage, the pulse became increasingly rapid, weaker and irregular, there was marked collapse with restlessness, profuse perspiration and frequent diarrhoea. Although camphor, ether, strychnine, digitalin and other stimulants and restoratives were given the patient's condition was becoming rapidly worse ; respiration failed on four occasions and was restored only by artificial means. Dr. Talukder, on account of the dehydration resulting from the sweating and diarrhoea, thought intravenous administration of hypertonic saline might be worth a trial. Three pints [strength not stated] were given and improvement was surprisingly rapid. All the symptoms abated and recovery was complete in 72 hours.

H. H. S.

MCGEORGE (Murray). **Haematological Variations in Fifty Normal Adult Males.**—*Jl. Path. & Bact.* 1936. Jan. Vol. 42. No. 1. pp. 67–73. With 4 charts. [16 refs.]

In recent months there has been considerable impulse in haematological investigations. Whereas much work has been done for many years on the blood changes in disease, attempts are now being made to establish the limits of the normal in different parts of the world, in different sexes at different ages and of persons engaged in various occupations [*ante*, pp. 75–9].

The author has set out to determine the absolute figures for corpuscular volume, haemoglobin and corpuscular haemoglobin concentration in 50 London medical students all believed to be in normal health. Blood was taken by venepuncture, and 5 cc. placed at once in a small test-tube containing 4 mgm. of potassium oxalate and 6 mgm. of ammonium oxalate, both in solid form, for in this concentration cell shrinkage does not occur on centrifugation. Haemoglobin was

estimated by Haldane's method, 13·8 gm. corresponding to 100 per cent., and the tube in use was checked by Van Slyke determinations. Sedimentation rate and mean corpuscular volume were determined by the Wintrobe tube method.

American figures for the haemoglobin have generally been found a little higher than those recorded by investigators in England. The author gives his own findings and those of other authorities—Price-Jones, Osgood, Haskins, Trotman, Vaughan, Goddard, Whitby and Hynes, Jenkins and Don—for comparison. For these the original must be consulted. In the author's cases, the average red cell count ranged between 4·85 and 6·37 million per cmm. with an average of 5·48. The haemoglobin average was 110 per cent. Haldane or 15·2 gm., the limits being 94 per cent. (13·0) gm. and 125 per cent. (17·4 gm.). The mean corpuscular volume (obtained by dividing the volume of packed red cells in cc. per 1,000 cc. blood by the number of cells in millions per cmm.) was 84·6 (limits 78·3 and 90·0) ; the mean corpuscular haemoglobin (average Hb content per cell expressed in micromicrograms, and $= \frac{\text{Hb. in gm. per 1,000 cc. blood}}{\text{Red cells in millions per cmm.}}$) was 27·8 (limits 24·5 and 29·5), and the mean corpuscular haemoglobin concentration $= \frac{\text{(Hb. in gm. per 100 cc. blood}}{\text{Vol. of packed cells per 100 cc. blood}}$) was 33·0 (limits 30·0 and 35·1). The sedimentation rate ranged between 1 and 7 mm. (Wintrobe's tube) with an average of 3·8. Much higher readings even up to 16 were obtained if the tubes were not placed to stand absolutely perpendicularly. The individual findings are detailed in tabular form in a useful appendix, and the author concludes that his studies " indicate the wide variations in these figures which are compatible with health. In the application of haematological standards to clinical medicine, therefore, it is the normal range rather than the average figure which is of practical importance." [This is a matter often forgotten when figures for a single case are recorded in disease and departures from the average are regarded as abnormal.] *H. H. S.*

Holiday (Ensor Roslyn), Kerridge (Phyllis M. Tookey) & Smith (Frank Campbell). **Amount of Haemoglobin in the Blood.**—*Lancet.* 1935. Sept. 21. pp. 661–665. With 2 figs. [40 refs.]

The authors point out that the amount of haemoglobin in a given volume of blood cannot at present be accurately estimated, and that the percentage of haemoglobin relative to a " normal " standard is accurate only for the apparatus employed and differs widely with different instruments. In this paper the haemoglobinometers at present in use are critically surveyed. It is pointed out that the most satisfactory standard would be afforded by known concentrations of pure haemoglobin, but as this is not yet practical recourse has to be made to certain chemical and physical constants of haemoglobin. Iron content and extinction coefficient at the head of one of the absorption bands of haemoglobin are the most reliable and easily determined constants of haemoglobin. The latter was used in calibrating the photo-electric haemoglobinometer described in this paper. The normal value, which corresponds with 105·5 per cent. on the Haldane scale, was translated into terms of extinction coefficient by parallel determinations with a photo-electric haemoglobinometer and a Hilger

quart spectograph with " Spekka " photometer on the blood of forty-two subjects whose blood varied in haemoglobin concentration from 20 to 120 per cent. of the normal value.

For details of the apparatus and method the original paper should be consulted. *N. Hamilton Fairley.*

HARVEY (W. F.) & HAMILTON (T. D.). **Studies in Method and Standardisation of Blood Examination. II. Sedimentation Rate and Sedimentation Volume of Blood.**—*Edinburgh Med. Jl.* 1936. Jan. Vol. 43. No. 1. pp. 29–46. With 8 figs. (3 on 1 plate) & 2 graphs. [18 refs.]

In this paper the authors describe a capillary tube technique for determining the sedimentation rate and sedimentation volume of blood which is stated to be both dependable and easy to carry out and repeat. A capillary method had already been described by M'Sweeney, but, as the authors point out, the present technique differs in certain details.

N. Hamilton Fairley.

DHAR (Jyoti). **Haematological Studies in Indian Women. (Part Four). A Preliminary Report on the Determination of the Schilling Haemogram (Differential Leucocyte Count) in Eighty-Six Normal Bengali Women.**—*Calcutta Med. Jl.* 1935. Dec. Vol. 30. No. 6. pp. 333–366. With 5 figs. [50 refs.]

Dr. Dhar has continued his haematological studies and the present gives an analysis of the results of examining the leucocyte formula of 86 normal Bengali women. He discusses Arneth's classification and is fully cognizant of the difficulties due to personal differences in interpretation of what constitutes separate lobes of the nucleus. He therefore considers the modifications of PAPPENHEIM and of COOKE and PONDER, the " weighted mean " of the latter authors, the index of BUSHNELL and TREUHOLZ, and that of HEUSON. He then defines the characters of the various white cells in order that there may be no confusion regarding his meaning and records his findings, in accordance with the haemogram of SCHILLING. The women were between 16 and 35 years and, so far as was known, healthy. Of course 86 is a very small number on which to base standards, but the figures obtained form a guide for more extensive researches. He found the following averages in percentages, the range is given in brackets after each : Basophile 0·1 (1–2) ; eosinophile 3·2 (1–12) ; myelocyte 0·01 (only one was seen in all) ; juvenile forms were absent in 21 of the subjects, the average was 1·4 (1–4) ; " staff " forms 9·8 (2–18) ; segment 53·5 (40–73) ; lymphocytes 30·3 (17–42), and large mononuclears 1·5 (1–6).

H. H. S.

JUSTER (Irving R.). **The Normal Range of the Leucocyte Count determined weekly over an Extended Period.**—*Jl. Lab. & Clin. Med.* 1936. Jan. Vol. 21. No. 4. pp. 376–380. With 3 charts.

Before starting an investigation into the leucocytic changes, qualitatively and quantitatively, occurring in disease, the author wisely undertook a study of 11 persons, believed to be in normal health, making a total leucocyte count weekly, on the same day and at the same hour. Their ages ranged between 17 and 50 years, 7 were women,

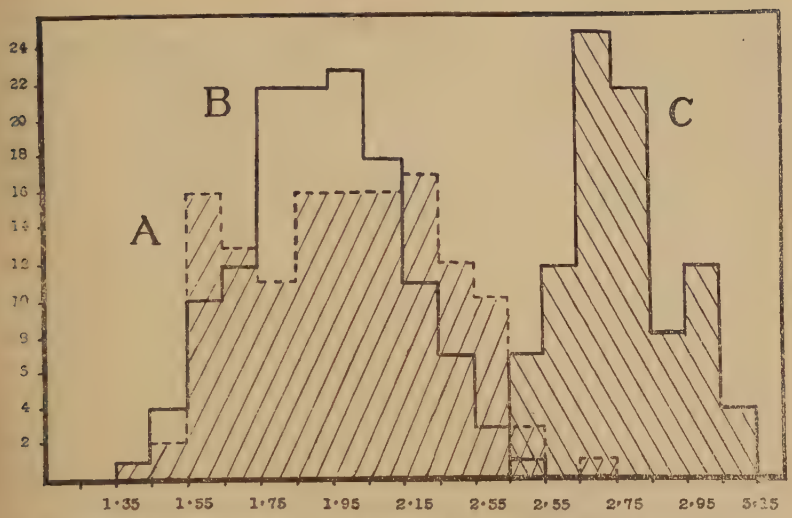
4 were men. The lowest number of counts made in any one individual was 11, the highest 85. Nine were fairly closely similar (see table) and are therefore regarded as normal; two differed from the others and were designated abnormal, although nothing was detected physically to account for the difference. They were considered to be "in a more emotional state than the others," and psychological conditions have been shown to be accompanied by a leucocytosis. The average normal range was seen to be considerable, from 4,000 to 9,000, an increase over 100 per cent. from the lowest to the highest. Neither season, sex, nor age appeared to exert any material influence on the total count.

	Case	Lowest	Highest	Average
Normal	1	4,700	10,700	7,300
	2	4,200	10,600	7,100
	3	4,000	9,300	6,700
	4	3,700	10,000	6,900
	5	4,300	10,700	7,100
	6	4,300	9,600	6,600
	7	4,000	8,300	5,800
	8	6,200	8,600	7,300
	9	4,800	7,500	6,100
Abnormal	10	5,300	12,600	8,100
	11	6,400	12,900	9,100

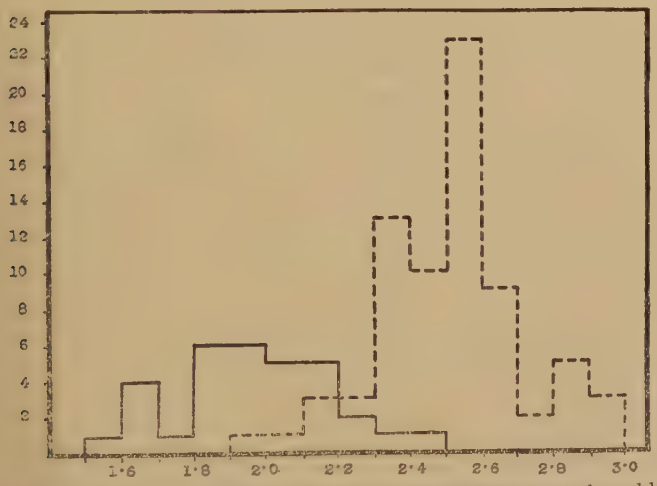
H. H. S.

KENNEDY (Walter P.) & MACKAY (Ian). **Further Studies on the Polynuclear Count in Iraq.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Nov. 25. Vol. 29. No. 3. pp. 291–298. With 4 figs. [11 refs.]

In a previous paper Kennedy demonstrated a marked shift to the left in the Arneth count of natives of Iraq [see this *Bulletin*, 1935, Vol. 32, p. 528]. With a view to testing whether this was the effect of or was influenced by infection or race, the authors made further investigations on 134 healthy British airmen and officers stationed near Baghdad. None had been there for less than 6 months. They also made similar observations on the blood of 32 rabbits, determined healthy by autopsy. They found that the "weighted mean" of the polynuclear count was a better standard than the Arneth index. The weighted mean "is found by multiplying the total cells in each class by the number of the class, summing the results, and dividing by the number of cells counted." For the Iraqi this was 1·99, for the airmen 1·94. The accompanying graphs demonstrate clearly the definite move to the left both in human beings and in rabbits as compared with figures in Britain and also that there is no marked difference between the British airmen in Iraq and the natives. No explanation is given but it is suggested that "Climatic conditions appear to be a likely determinant, the ultra-violet radiation and heat are probably important factors." Records from other countries on these lines would be of great interest, not only for comparison but also as a help towards elucidating the reason.



Frequency polygons of weighted means of polynuclear counts: A, British airmen; B, Iraqi nationals; C, Cooke & Ponder's health standard group.



Frequency polygons for weighted means of polynuclear counts for rabbits in Iraq, whole line; and in Britain, dotted line.

[Reproduced from the *Transactions of the Royal Society of Tropical Medicine and Hygiene.*]

H. H. S.

Inclan (Clemente) & Santamarina (Victor). Estudio de la sangre del niño recien nacido normal. [**Study of the Blood of the Normal Newborn Infant.**]—*Archivos Med. Infantil.* 1935. July–Aug.–Sept. Vol. 4. No. 3. pp. 125–167. With 37 graphs & 10 figs.

There has been in recent months a considerable activity in reporting the results of blood examinations. Attempts have been made to establish normal standards of the constituents for persons of different

races or living in different localities [*ante*, pp. 75–9] but the majority of these examinations have been made on adults, a few on children, but none, so far as the reviewer is aware, on the newly born. [The results of blood examination in young children are by no means infrequently misinterpreted because the medical man regards what may be closely approximating the normal in a child as a grave departure from what he has come to recognize as the normal (for adults). True it is a departure, but is not of the significance that a similar difference would be in the case of an adult.] The value of this investigation is therefore great, for examinations were undertaken practically from birth and repeated during the early days of life and took account of the red corpuscles, their numbers and characters, the haemoglobin [unfortunately stated as percentage only], the leucocytes, the Arneth count, and the coagulation time. A few words are called for on each of these; for further details the original article, which is embellished by many graphs and several photomicrographs, must be consulted.

An introductory section gives some general remarks to the effect that at birth the blood and lymphocyte factories are in process of development and that irregularities in the blood picture are to be expected; young forms of cells are more common, myelocytes and even promyelocytes are by no means rare, immature red cells are equally common, all evidence of hyperactivity of the blood factories.

Among the erythrocytes anisocytosis is readily observable [there is a good illustration of this] and the smaller forms are particularly common in the early days of life. Polychromatophilia is constantly present, and very marked in the first 2–3 days; normoblasts are present up to as many as 8 per cent. and even 18 per cent. has been seen. Megaloblasts have been reported by others, but the authors very rarely found them. They determined that there was a very definite erythrocyte curve or more strictly a definite variation from day to day. At first a polyglobuly, purely physiological, with a total of over 6 million, falling in 24 hours or so to a little over 4 million, and rapidly rising again to six and by the fifth day about 5–5½. The haemoglobin also varies, oscillating between 100 and 130 per cent., sometimes remaining high to the 7–9th day (when examinations ended), at other times falling to 80–90 per cent. [This statement loses much in that the mode of estimation is not stated, and these, as is well known, vary greatly in accuracy; estimation in grams per cent. would be far safer and convey more information.]

The leucocyte total also is variable. It is high at birth; it was found to vary on the first day between 18,000 and 36,000 per cmm., but fell rapidly by the third day to between 8,500 and 14,000 and kept between these limits till the end of examination (8th–9th day). The relative counts showed interesting variations. At birth the polymorphonuclears usually preponderated enormously, 92–94 per cent., lymphocytes 7–4 per cent.; within a day or two the former fell to 65–85 per cent. and the latter rose to 15 or even 25 per cent., and at the 8th or 9th day the lymphocytes usually exceeded the neutrophiles, and by the 12th day they might be equal. Eosinophiles were more frequent than large mononuclears; the two together varied between 0 and 10 per cent.; on rare occasions eosinophiles were as high as 12 and even 15 per cent.; it was very exceptional for monocytes to be as numerous as this. The authors saw no basophile cells. Young forms of neutrophiles were seen in a proportion of 4–10 per cent., myelocytes about the same, and *stabkernige* from 10–35 per cent. Owing to the large proportion

of young forms of neutrophiles the Arneth count showed a definite shift to the left. There appeared to be no constant relation between the numbers of large and small lymphocytes. Lastly, the coagulation time. In the newborn this was very rapid, oscillating between $\frac{1}{4}$ and $\frac{3}{4}$ minute in the great majority of cases ; a few showed a clotting time as long as one minute.

[This article has been dealt with fully because, although the findings confirm in many particulars those recorded for European children at home, such details have not been worked out in native infants.]

H. H. S.

Osgood (Edwin E.). **Normal Hematologic Standards.**—*Arch. Intern. Med.* 1935. Nov. Vol. 56. No. 5. pp. 849–863. With 6 charts. [14 refs.]

This study with a view to establishing the normal blood standards is worthy of the highest praise. By examining in detail the blood from a large number of persons, living in or near Portland, Oregon, all apparently healthy and native born, the author has determined as accurately as he could the normal erythrocyte and leucocyte totals, haemoglobin values in percentage and, what is of much greater value, in grams, the cell volumes, reticulocyte counts, differential leucocyte counts, sedimentation rates and so forth, for both males and females, children from 4 years of age to adults of 30 years or more. He has thus established the local standards and his table will be of great use for comparison elsewhere. The details and choice of methods are given in the original, to which reference can be made, but most if not all of them will be found in good modern text-books on haematology.

In order that others may have the standard for comparison, Dr. Osgood's table is reproduced. In only one investigation, that of reticulocyte percentage, were there less than 500 persons examined.

Hematologic Values obtained for Healthy Subjects in the Present and Similar Series.

	No. of Subjects	Age, Years	Sex	Average Values		Range of Values
				Clinical	Actual	
Erythrocyte count millions	215	4–13	M & F	5·0	(5·04)	4·2–5·8
	259	14–30+	M	5·4	(5·42)	4·6–6·2
	152	14–30+	F	4·8	(4·83)	4·2–5·4
Hemoglobin, percentage	215	4–13	M & F	85	(85·90)	70–100
	259	14–30+	M	115	(114·82)	100–130
	152	14–30+	F	100	(100·80)	85–115
Hemoglobin, gm. ...	215	4–13	M & F	12·0	(11·92)	10·0–14·0
	259	14–30+	M	15·8	(15·84)	14·0–18·0
	152	14–30+	F	13·8	(13·91)	11·5–16·0
Hemoglobin coefficient	215	4–13	M & F	12·0	(11·87)	10·20–13·80
	259	14–30+	M	14·7	(14·66)	12·75–16·75
	152	14–30+	F	14·3	(14·41)	12·50–16·00
Cell volume, cc. per 100 cc.	215	4–13	M & F	36	(36·02)	31–41
	46	14–17	F	36	(36·73)	31–41
	63	14–19	M	41	(40·14)	36–45
	106	18–30+	F	41	(40·96)	36–45
	153	20–30+	M	45	(44·79)	40–50

	No. of Subjects	Age, Years	Sex	Average Values		Range of Values
				Clinical	Actual	
Volume coefficient ...	304	4–17	M & F	36	(36·31)	31–41
	173	18–30+	M	41	(40·29)	35–45
	106	18–30+	F	43	(42·83)	38–47
Color index	626	4–30+	M & F	1	(1·00)	0·85–1·15
Volume index	583	4–30+	M & F	1	(1·00)	0·85–1·15
Saturation index ...	583	4–30+	M & F	1	(1·00)	0·90–1·10
Reticulocytes, percentage	476*	4–30+	M & F	1·5	(1·46)	0·50–3·00
Leukocyte count ...	86	4–7	M & F	10,400	(10,365)	6,000–15,000
	242	8–18	M & F	8,300	(8,342)	4,500–13,500
	269	19–30+	M & F	7,400	(7,447)	4,500–11,500
Segmented neutrophils, percentage	241	4–14	M & F	38	(37·60)	18–58
	120	15–19	M & F	48	(47·65)	25–75
	236	20–30+	M & F	54	(54·26)	33–78
Neutrophil staff cells, percentage	219	4–13	M & F	3·0	(3·07)	0–10
	378	14–30+	M & F	0·8	(0·78)	0–5
Lymphocytes, percentage	241	4–14	M & F	48	(48·21)	21–71
	120	15–19	M & F	42	(41·91)	22–62
	236	20–30+	M & F	38	(37·76)	18–65
Monocytes, percentage	219	4–13	M & F	3	(3·08)	0·5–7
	378	14–30+	M & F	4	(4·18)	0–9
Segmented eosinophils, percentage	219	4–13	M & F	2·8	(2·79)	0–8
	378	14–30+	M & F	1·9	(1·90)	0–6
Segmented basophils, percentage	597	4–30+	M & F	0·5	(0·52)	0–2
Disintegrating cells, percentage	219	4–13	M & F	5·0	(4·89)	0–10
	378	14–30+	M & F	3·5	(3·47)	0–7
Sedimentation rate, mm. in 15 min.	853*	4–30+	M & F	—	—	0–5
Sedimentation rate, mm. in 45 min.	853*	4–30+	M & F	—	—	1–30

* The discrepancy between these values and those recorded on the charts is due to the fact that the ages were not recorded for some of the adults studied.

H. H. S.

RADHAKRISHNA RAO (M. V.). **Histopathology of the Liver in "Infantile Biliary Cirrhosis."**—*Indian Jl. Med. Res.* 1935. July. Vol. 23. No. 1. pp. 69–88. With 32 figs. (4 coloured) on 8 plates. [63 refs.]

That a peculiar type of cirrhosis of the liver occurs in Indian children has been known for nearly half a century, being first described by SEN in 1887. Apart from a few cases of a like character reported from Mexico and North China the condition seems to be peculiar to India. Accurate description of the morbid anatomy and histology present in this disease will do much to elucidate its, at present, obscure pathogeny, hence the value of this detailed account based on a study of 5 cases of so-called "infantile biliary cirrhosis." Various staining methods were employed. The subjects from which the tissues were taken were between 1 year and 6 months and 3 years (the age of one was not known). The histories, so far as they were ascertainable, and the state of the liver in each case is related (changes in other organs receive a word or

two in two of the cases only). In one case there are superadded inflammatory changes of cholangitis and surrounding infiltration but the lesions in the others are as follows. The hepatic cells are necrosed generally throughout the liver, some more, others less ; in the meshes of an oedematous non-vascular connective tissue are islets of hepatic tissue, some degenerating ; the hepatic vessels but not the portal, show obliterative lesions (well demonstrated in the camera lucida drawings), with disorganization of the reticulum of the sinusoidal capillary bed round these venous terminals and, lastly, attempts at regeneration of the parenchymal cells.

The microphotographs and the coloured camera lucida drawings are very clear and instructive.

The genesis of the fibrous tissue is traced to " atrophy and degeneration of the parenchymal mantle around the hepatic venous tree (due to an interference with the free flow of portal blood)" owing to sclerosis of the veins and endophlebitis. The changes are in fact those described in toxic cirrhosis, but the coexistence of regenerative and degenerative processes indicates a toxin of sub-acute properties, the determination of which must be the subject of further investigation. *H. H. S.*

Culbertson (James T.). **Antibody Production by the Rabbit against an Ectoparasite.**—*Proc. Soc. Experim. Biol. & Med.* 1935. May. Vol. 32. No. 8. pp. 1239–1240.

The serum of rabbits heavily infested by the mite *Psoroptes communis* var. *cuniculi* gives a precipitate with an extract from the bodies of the mites, whereas the serum of uninfested rabbits does not. The sloughing of the affected skin is possibly an Arthus reaction resulting when the specific antigen of the mite saliva is introduced into the sensitized animal. *V. B. Wigglesworth.*

Bishopp (F. C.) & Smith (Carroll N.). **Mosquito Work throughout the World in 1934.**—Reprinted from *Proc. 22nd Ann. Meeting New Jersey Mosquito Extermination Assoc., Mar. 6, 7 & 8, 1935.* 27 pp.

The paper, which is one of a series appearing every year, summarizes current work on mosquitoes and their relation to disease. It deals among other things with taxonomy, the relation of mosquitoes to malaria and yellow fever, surveys in particular areas, efforts at control and studies on food, resting places and hibernation. The paper concludes with a special section on the control of mosquitoes in North America.

It is difficult to give a short résumé of something which is in itself a review. Perhaps the British reader, familiar at first hand with the greater part of the work, will be most interested in the account of the extensive operations carried out in the southern part of the United States. The work there was undertaken partly in the interests of health, partly to provide useful work for the unemployed under the Emergency Relief Administration. We understand that a vast amount of draining and such work was carried out, but that there is some question whether the rural population in the areas drained will be able to maintain the work in a normal year and whether the ditches may not themselves become dangerous breeding places. *P. A. Buxton.*

FENG (Lan-Chou). **The Present Status of the Knowledge of the Mosquitoes of China and their Relation to Human Diseases.**—*Chinese Med. Jl.* 1935. Nov. Vol. 49. No. 11. pp. 1183–1208. With 2 charts, 1 map & 10 figs. on 6 plates. [72 refs.]

The author presents a full review of our present knowledge of the mosquitoes of China and of their relation to malaria, filariasis and dengue.

Of the species of Anopheles, *Anopheles hyrcanus* is the most widely distributed for it is found in plains of most parts of China. In South China some fifteen species of Anopheles occur, most of them derived from the Oriental Region. In this area the most important carriers of malaria appear to be *A. minimus* and *jeyporiensis*, though *maculatus* also occurs. The southern species extend northwards to approximately 30° North. In the north of China (from 35° to 40° North) the most important species is *Anopheles pattoni*, which breeds in the hills, generally in running water. Distribution of the Culicines, which is discussed less fully, also shows that the fauna is partly southern, partly northern in origin, as is natural in so great a territory. The paper includes a tabulated statement of what is known of the infection of Anopheles in China with Plasmodium; the author has included the results of dissection of wild specimens and the experiments carried out in laboratories. He proceeds to discuss the species principally concerned in transmission.

The section dealing with types of malaria and their distribution is not so full and it is confined mainly to what has been learned since the subject was reviewed by FAUST in 1926. It is clear that south of the Yangtse River malaria is widely spread and of greater or less gravity, also that all three types of parasites occur. In North China malaria is less abundant and it is generally of the benign tertian type.

Some years ago the author gave an account of the distribution of filariasis due to *Wuchereria bancrofti* in China. The disease is particularly abundant in the provinces along the south part of the coast and along the lower course of the Yangtse River. Recent work has shown that *Microfilaria malayi* is not rare and that it is rather widely spread. The mosquito hosts of these parasites have been investigated in the laboratory and it is now clear that *Culex fatigans* is not the only carrier of *W. bancrofti* in China; indeed it is less efficient than *C. pipiens*. Several other mosquitoes have been studied and shown to be inefficient carriers, but it seems that species of Anopheles transmit it readily enough. *Microfilaria malayi* develops well in Anopheles and in Mansonioides. Results of dissecting wild mosquitoes, mostly taken from houses, are also reported, but the author is wisely sceptical of their value, recognizing how difficult it is to identify a larval nematode in a mosquito.

A full list of references brings this useful piece of work to an end. The paper will stimulate workers to supply information on many matters about which we know nothing at present. *P. A. B.*

HEADLEE (T. J.). **The Development of Mechanical Equipment for sampling the Mosquito Fauna and Some Results of its Use.**—*Proc. 19th Ann. Meeting New Jersey Mosquito Extermination Assoc., 1932.* pp. 106–126. With 2 plates.

BRADLEY (G. H.) & MCNEEL (T. E.). **Mosquito Collections in Florida with the New Jersey Light Trap.**—*Jl. Econom. Entom.* 1935. Oct. Vol. 28. No. 5. pp. 780–786.

The papers deal with an automatic device electrically operated, which will obtain a sample of mosquitoes throughout the night.

The author of the first paper points out that much of what we know about the distribution of mosquitoes and about their density is based on collecting by hand. In this process there is a large element of personal error. He has been anxious to substitute some more standardized and perhaps more effective method, and he has finally produced a trap into which a 50-watt Mazda lamp attracts mosquitoes, and from which they are swept by a fan into a cyanide bottle. In its final form the trap catches roughly twice as many insects per hour as an expert man, including large numbers of all the commoner species. By making slight alterations to the trap the author has accumulated information about the time of night at which certain species fly.

The second paper sets out results obtained in Florida and shows that the trap has considerable utility : it catches a great variety of species including many males, and considerable numbers of Anopheles of several species. The paper contains detailed information about several mosquitoes which are locally important. It is not suggested that the trap obtains an unbiased sample of all the prevalent mosquitoes, but it is clear that its results give a valuable confirmation of what may be obtained by other methods. *P. A. B.*

Russell (Paul F.) & Baisas (Francisco E.). **The Technic of Handling Mosquitoes.**—*Philippine Jl. Sci.* 1935. Mar. Vol. 56. No. 3. pp. 257–294. With 12 figs. & 8 plates. [27 refs.]

The ground covered by this paper, which is concerned with conditions in the Philippines, is a good deal wider than might be inferred from the title, and includes the collecting of both larvae and adults in addition to subsequent operations. While the bulk of what is stated is to be found in one form or another in various text-books, and should be familiar to the expert, the beginner who studies these pages cannot fail to acquire useful information. *Inter alia*, whosoever aspires to become a competent collector of mosquito larvae is warned that he will never do so if he fear to wet his feet ; but by way of compensation he is told that a diurnal search for adults, in typical shelters such as small caves, " presents no difficulties " apart from the fact that snakes occasionally choose to lie up in the same retreats. " Artificial daytime shelters " [presumably free from the last-mentioned drawback] " can be made by lining boxes with moist earth," and a simple but ingenious method of doing so is duly described. *E. E. Austen.*

de Meillon (Botha) & Osburn (H. S.). **A Case of Intestinal Myiasis caused by the Larvae of *Chrysomyia chloropyga*, Wied. (Diptera, Calliphorinae).**—*South African Med. Jl.* 1935. Sept. 28. Vol. 9. No. 18. pp. 654–655.

The patient, an African girl, passed numbers of larvae in her stools after " a vermifuge " had been administered. Her mental state subsequently became brighter and the " fits " of which she had complained less frequent.

The identification of the fly was made on larval characters, adults not being bred. *Chrysomyia chloropyga* is a widely distributed African insect, breeding commonly in carcasses, and occasionally causing external myiasis of man and animals, especially sheep. It seems that there are no recorded cases of intestinal myiasis, due to this or other

members of the genus *Chrysomyia*. It is remarkable that cases have not been observed, for it is evident from the facts here recorded that this insect can support life in the human intestine. *P. A. B.*

PARISH (H. E.) & LAAKE (E. W.). **Species of Calliphoridae concerned in the Production of Myiasis in Domestic Animals, Menard County, Texas.**—*Jl. Parasitology.* 1935. Aug. Vol. 21. No. 4. pp. 264–266.

The purpose of the observations described in this paper was to determine what other flies besides the screw-worm fly (long referred to as *Cochliomyia macellaria*, but now known to be really *C. hominivorax*—see this *Bulletin*, 1934, Vol. 31, p. 359) are responsible for wound myiasis in domestic animals in the south-western United States, and the extent of the injuries so caused. The latter question is not dealt with in detail, but the results of collecting and breeding out maggots from wounds in sheep, goats, calves and cattle during the period August, 1931, to July, 1933, are summarized. In summer and autumn, screw-worm flies formed more than 99 per cent. of all adults reared from larvae found in wounds on the above-mentioned livestock. On the other hand, during the spring of 1933 upwards of 67 per cent. of all flies so obtained were *Phormia regina*, "a cold-weather species of blowfly and very abundant during early spring." In two or three cases a few larvae of a flesh fly, *Sarcophaga plinthopyga*, were found. *E. E. A.*

JAMES (J. F.). **A Simple Fly Trap.**—*Jl. Roy. Army Med. Corps.* 1935. Dec. Vol. 65. No. 6. pp. 400–401. With 2 figs. [Summary appears also in *Bulletin of Hygiene*.]

The author describes a trap easy to make and without the drawbacks of the commonly used wooden trap with rollers. The accompanying illustrations give a good idea of the contrivance. A piece of an ordinary ghi tin 14 in. by 9 in. by 9 in. is cut away as shown in Fig. 1, the lower line being 3 inches from the base and the upper bisecting the top. If desired straight cuts may be made, as in Fig. 2, thus removing a rectangular instead of an inclined plane or shovel-shaped piece; a stout wire across the top, 2 inches from the back, serves the double purpose of hanging up the trap and of supporting material, such as

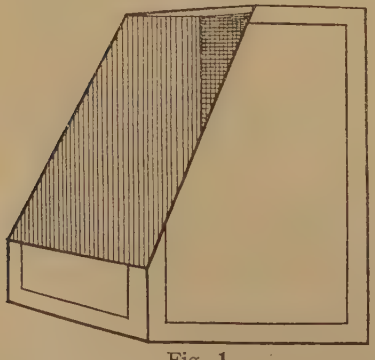


Fig. 1.

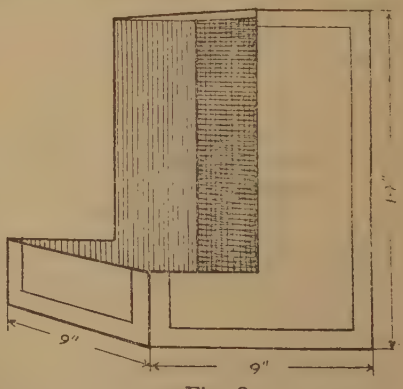


Fig. 2.

Fly traps, made from ghi tins or similar tin receptacles, to contain sugar or gur arsenic poison bait.

[Reproduced from the *Journal of the Royal Army Medical Corps*.]

gunny, which passes down to the bottom and covers the floor of the tin, on which the poison chosen is placed, about an inch deep. The lower part of the gunny is thus kept wet and the back can be wetted by merely laying the tin on its back. The tins " are collected, cleaned, and the solution changed twice weekly under the direct supervision of a sanitary inspector." *H. H. S.*

GENEVRAY (J.), GASCHEN (H.), AUTRET (M.) & DODERO (J.). Paederus vesicants (*P. fuscipes* et *P. alternans*) au Tonkin. Etude entomologique, clinique et expérimentale. [**Vesicating Paederus in Tonking.**]—*Arch. Inst. Pasteur d'Indochine.* 1934. Apr. No. 19. pp. 313–329. With 1 coloured plate & 9 figs. on 5 plates. [18 refs.]

As is well known to the natives, most cases of vesicular dermatitis in Tonking are caused by the beetles *Paederus fuscipes* and *P. alternans*. The toxic substance has chemical properties identical with those of cantharidin. When applied to the skin of man or animals it produces lesions of the same kind as does cantharidin, and when injected it causes a glomerular nephritis. This active principle occurs in the blood of the insect and therefore escapes from any part of the body that is crushed.

V. B. Wigglesworth.

PERRY (H. Marrian) & POOLE (L. T.). **A Common Caterpillar Injurious to Man.**—*Jl. Roy. Army Med. Corps.* 1935. Oct. Vol. 65. No. 4. pp. 217–220. With 3 figs. & 1 plate.

Skin lesions due to the larvae of the Brown-tail Moth, *Euproctis chrysorrhoea*, can be caused by any of the larval hairs. Cases are described which show that the sensitivity of different subjects varies greatly and that the rash may vary from a transient urticaria to a vesicular rash requiring several days to develop.

V. B. Wigglesworth.

HAPPOLD (Frank Charles) & STEPHENSON (Dora). **The Toxicity of Bactericidal Substances for Flagellate Parasites, with Special Reference to their Application in the Isolation of** *Leptomonas* **Forms.** —*Parasitology.* 1935. July. Vol. 27. No. 3. pp. 383–393.

In a previous paper BOXHALL, Happold and LLOYD (*Parasitology.* 1934. Vol. 26. p. 44) have shown that cultures of leptomonads of certain flies can be obtained free from bacteria by mixing the intestinal contents with certain concentrations of quinanil and allowing the mixture to stand for some time before inoculation into culture media. The exposure to quinanil in some cases destroyed the bacteria and not the flagellates. The present paper describes the testing of other substances, with the result that besides quinanil the compound 2 (*p*-dimethylaminoanil)-β-napthoquinoline methochloride might be successfully used. For the purification of contaminated leishmania cultures the procedure was not successful. *C. M. Wenyon.*

Tokura (N.). Biologische und immunologische Untersuchungen ueber die menschenparasitären Trichomonaden. [**Biological and Immunological Research on Trichomonads Parasitic for Man.**]—Reprinted from *Igaku Kenkyu.* 1935. Apr. Vol. 9. No. 4. [In Japanese. [325 refs.]. German summary 13 pp. With 19 figs. on 2 plates.]

Working with cultures of various human trichomonads the author has found that their intravenous injection into rabbits results in the formation of species specific immune bodies the presence of which is indicated by the property of producing lysis in dilutions up to 1 in 4 and agglomeration in dilution of 1 in 6 of the flagellates in question. A trichomonad antigen is as capable of giving rise to complement fixing bodies as are bacteria. These serological studies with trichomonad flagellates appear to be the first of their kind. *C. M. W.*

Gupta (B. M. Das). **Some Observations on Pure Line Strains of** *Trichomonas hominis* **and Trichomonas of the Snake** *Natrix erythrogaster* **(a Non-Poisonous Water-Snake).**—*Jl. Trop. Med. & Hyg.* 1935. June 15. Vol. 38. No. 12. pp. 148–151. With 28 figs. on 2 plates.

The morphology of both *Trichomonas hominis* and a *Trichomonas* of the snake is described from pure line cultures started from single individuals. Both forms possessed four anterior flagella and one on the undulating membrane. The membrane flagellum in some cases became detached and acted as a trailing flagellum but in such cases there was no actual resemblance to *Eutrichomastix*, which is a distinct flagellate in the snake. In the case of *Trichomonas hominis* the dividing forms appeared to indicate that the axostyle divides longitudinally.

C. M. W.

Vittorio (Vanni). Ricerche sulla sarcosporidiosi. [**Investigations on Sarcosporidia.**]—*Ann. di Med. Nav. e. Colon.* 1935. Mar.–Apr. 41st Year. Vol. 1. No. 3–4. pp. 145–181. With 31 figs. (11 coloured) on 5 plates. [34 refs.]

In this paper the author describes certain experiments he has made with the sarcosporidian of the sheep, *Sarcocystis tenella*. He claims to have discovered that the spores ingested by flies (*Sarcophaga* and *Calliphora*) in the course of 24–48 hours become converted into metacyclic forms, some of which at least are provided with flagella. These metacyclic forms are passed in the faeces of the flies. Of two rats fed with the faeces of infected *Sarcophaga* and two with those of *Calliphora*, one of the latter 40 days later was found to have developing sarcosporidia in most of the muscular system. As rats fed with spores taken directly from the sheep did not become infected it is concluded that *Calliphora* is the intermediate host of *Sarcocystis tenella*. The changes which take place in the flies are illustrated in a series of plates. Though the authors state that they have been careful to exclude flagellate and other natural infections of the flies one is still left with the impression that some of the so-called metacyclic forms, particularly the flagellates, may actually be natural parasites of the flies. *C. M. W.*

Cheissin (Eug.). Vom Einfluss anaërober Bedingungen auf verschiedene Sporulationsstadien der Oocysten von *Eimeria magna* und *Eimeria stiedae*. [**Effect of Anaerobiosis on Development of Eimeria.**]—*Arch. f. Protistenk.* 1935. Vol. 85. No. 3. pp. 426–435. With 1 fig.

Under anaerobic conditions the oöcysts of rabbit coccidia will neither begin nor complete sporulation though the intervening development will take place. *C. M. W.*

Ciferri (R.) & Redaelli (P.). Une quatrième espèce du genre "Histoplasma." [**A Fourth Species of the Genus Histoplasma.**]—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1935. July. Vol. 7. No. 7. pp. 245–252.

The authors refer to three papers recently published by them. In the first they showed, experimentally, that Darling's Histoplasmosis is a mycosis of the reticulo-endothelial system; in the second they advanced arguments for the inclusion of *Cryptococcus farcinimosus* Riv. & Mic. in the genus Histoplasma; in the third they pointed out affinities existing between *H. farcinimosum* (Riv. & Mic.) Cif. & Red., and *H. capsulatum* Darling, and described a third species of the genus: *H. muris*.

The present paper attempts to show that a yeast-like fungus isolated from a disease resembling dermatitis exfoliativa by Hansmann and Schenken in the United States and named by them *Sepedonium* sp. Hans. & Schenk., is in reality a new species of Histoplasma; the fourth species of the genus.

Ciferri and Redaelli refute the recommendation of Moore, that the fungus should be placed in the genus *Posadasia* Canton as *P. pyriformis*, Moore, on the grounds that insufficient evidence was put forward.

In giving their reasons for naming the new fungus *Histoplasma pyriformis* (Moore) Cif. & Red. n. comb., Ciferri & Redaelli admit that, up to the present, they have had no opportunity to examine the fungus in culture or in the tissues, and their study was limited to the published description by Hansmann and Schenken and the accompanying photomicrographs.

The clinical condition is of great interest and the description should be read in the original paper by Hansmann and Schenken. It commenced as a dry scaly lesion on the back of the leg and spread gradually over the whole surface of the body, suggesting dermatitis exfoliativa; but the ultimate diagnosis was "dermatitis associated with lymphadenitis." The disease resisted treatment and ended fatally after a duration of fifteen years. In addition to the skin and lymphatic lesions, the mouth showed a local condition of thickening of the mucosa with little granular lesions, erosions and ulceration.

The fungus was isolated during life from the skin, an inguinal gland and the buccal mucosa, and sections of the tissues showed it to be present as little yeast-like bodies chiefly enclosed within phagocytes and endothelial cells but occasionally free in the tissues.

The autopsy showed no enlargement of the spleen or liver but cirrhosis of both these organs; all the superficial lymphatic glands were enlarged and hard and contained the parasite; the adrenals showed zones of caseous necrosis, resembling tuberculosis, in both medulla and cortex, and the parasite was present; in the lungs the parasite assumed

the pyriform shape, and in the skin the mononuclears were sometimes filled with "yeasts"—as many as 20 or 25, each with a well defined capsule, being included within a cell. Giant cells were relatively rare. The parasite, which resembled in appearance the Leishman-Donovan body had a diameter of 3μ to 6μ but varied in size. It was enclosed in a colourless capsule and occasionally showed evidence of budding.

The fungus was easily cultivated on various media at 28°C. and 30°C.; growing aerobically it formed a mycelium "irradiating" yeast cells, but under anaerobic conditions it formed only rounded yeasts. In hanging drop cultures, chlamydospores, apical and intercalary, developed in the mycelium.

Guineapigs and rabbits were found resistant to experimental infection but dogs and mice were susceptible, and, after subcutaneous inoculation, developed lesions of the disease in the lungs, spleen, adrenals and liver. Retroculture was obtained from the animals three to four weeks after inoculation.

On the following analogies to *H. capsulatum*, Ciferri and Redaelli regard the parasite as a species of Histoplasma.

(1) Multiplication in the tissues, by budding, of little cells enclosed in a hyaline capsule. The cells are occasionally free but are usually enclosed within macrophages and the reticulum cells of the spleen and lymphatic glands.

(2) Multiplication *in vitro* by mycelium and chlamydospores in conditions of *normal* life, and as colonies of yeasts under *particular* conditions.

(3) The formation in culture of resistant cells (chlamydospores and stalagmospores), at first smooth, then tuberculated, verrucose or spinous.

(4) The disease caused is resistant to all treatment attempted and ends fatally.

(5) Amongst laboratory animals, dogs are particularly receptive to infection, and, after inoculation, the disease evolves in them as a generalized infection of the reticulo-endothelial system. *J. T. Duncan.*

Chopra (R. N.), Gupta (J. C.) & Roy (A. C.). **Action of Emetine on the Activity of the Adrenal and Thyroid Glands.**—*Indian Jl. Med. Res.* 1935. Apr. Vol. 22. No. 4. pp. 771–776. [12 refs.]

Chopra and co-workers showed that in Belgian hares after intravenous injections of organic compounds of antimony there was a definite increase in the residual epinephrine content of the adrenal glands as compared with the normal gland; after ten injections the adrenalin content was almost doubled. Large doses of organic arsenicals produced a remarkable decrease in the residual adrenalin.

As a result of the work here described it is shown that after a series of 8 intravenous injections of small (therapeutic) doses of emetine hydrochloride in Belgian hares there is a definite decrease in the residual adrenalin. The iodine content of the thyroid gland is also decreased and runs more or less parallel with the adrenalin content.

A. G. Bagshawe.

Gessner (Otto) & Esser (Werner). Ueber die analeptische Wirkung des Salamanderalkaloides Samandarin. [**The Restorative Action of Samandarin.**]—*Arch. f. Experim. Path. u. Pharm.* 1935. July 16. Vol. 178. No. 6. pp. 755–759. [12 refs.]

Samandarin is an alkaloid obtained from the cutaneous glands of certain species of salamander and is a poison producing convulsions.

In experimental work it was found to act as a respiratory stimulant in warm-blooded animals and in the present article the authors relate experiments to test the restorative action of the toxin in narcotized animals, both cold- and warm-blooded. Its action is on the medulla oblongata. As examples of cold-blood animals salamander-larvae were utilized and as warm-blooded the rabbit. The narcotics used in the case of the former were ethyl alcohol, chloral hydrate, avertin, and veronal; for the latter methane subcutaneously and paraldehyde by mouth. The effects on warm-blooded animals are the only ones of interest here. These were, first, acceleration and deepening of respiration, followed by rise of blood pressure due to stimulation of the vasomotor centre. But, the authors conclude, the therapeutic range of this poison as an analeptic is limited because of its convulsant action in any but minute doses. *H. H. S.*

Ramaqa (Vilikesa T.). **My Experiences during a Visit to Ono-I-Lau.**—*Native Med. Practitioner.* Suva. 1935. Sept. Vol. 2. No. 3. pp. 310–313.

The Native Medical Practitioner trained at the Central Medical School, Suva, has proved of great assistance in treatment of the sick and in inculcating the principles of hygiene among the scattered populations in the Western Pacific. From this brief account it is clear also that he finds a varied assortment of ailments to keep him in practice. Thus in a visit to Ono to inspect four villages with a combined population of a thousand or so the author saw 265 cases of hookworm infestation, 230 of influenza (introduced by return of visitors to a provincial meeting on another island), 118 of filariasis, 131 with injuries, 158 with alimentary complaints, 15 needing tooth extraction, 23 with trachoma, 4 with pulmonary tuberculosis, and a few cases of other conditions, such as yaws and ear disease. [See this *Bulletin*, 1934, Vol. 31, Suppl. p. 163* and 1935, Vol. 32, Suppl. p. 204*.] *H. H. S.*

Wilson (H. Ellis C.) & Mookerjee (S. L.). **Some Possible Factors in the Causation of Vesical Calculus in India. The Composition of the Human Urine on Different Diets.**—*Indian Jl. Med. Res.* 1935. Oct. Vol. 23. No. 2. pp. 491–499.

Much work has been carried out to determine the aetiology of vesical calculus. It has been shown that there is a high incidence of the disease in rats fed on a diet deficient in vitamin A. Later the cereal factor came into play, in addition; a diet rich in wheat containing extra lime but deficient in vitamin A was found very potent in producing calculus, oatmeal also but to a smaller degree. In Bengal the diet is probably as poor in vitamin A as is that of the Punjab, but rice is the chief cereal and lithiasis is less prevalent.

Investigations have been carried out by the authors to determine in a healthy subject the urinary products when an atta diet is given like that in the Punjab and when a rice diet is taken. Protocols are shown giving details of the analyses and the authors conclude that the urinary factors favourable to the development of calculus on an atta diet are two, viz. :—

" (1) A reduced urine volume on an atta diet as compared to a rice one, primarily due to a diminished salt intake—on the former diet but possibly accentuated by a diuretic principle present in rice. Up in the Punjab as compared to Bengal this factor might be still further accentuated due

to increased perspiration and salt loss through the skin. This would increase the tendency to the separating out of certain urinary constituents.

" (2) An increased oxalate and phosphate excretion in the urine on an atta diet—and on account of the reduced urine volume an increased concentration of these substances in the urine. The amount of calcium excreted in the urine is more than sufficient to combine with the oxalate and form an insoluble salt." *H. H. S.*

MARTIN (Hubert). **The Standardisation of Petroleum and Tar Oils and Preparations as Insecticides.**—*Ann. Applied Biol.* 1935. May. Vol. 22. No. 2. pp. 334–414. With 1 fig. [74 refs.]

The scope of this paper is indicated by its title. It is summarized here because emulsions containing mineral oils are frequently used to control insects of medical importance.

Users of insecticides and fungicides have a right to demand some form of guarantee that the products should reach a reasonable standard of efficiency and should not vary greatly in quality. Some detailed specifications are therefore desirable to which manufacturers would agree to conform, in the same way as " A.R." reagents and drugs are made to conform to specifications. At the suggestion of a committee set up by the Conference of Advisory Entomologists in December 1933, the author undertook to draw up draft specifications and methods of analysis, which are here presented with a rather full review of the evidence in their favour.

A number of items are specified by an oil company of which some, such as flash and fire points, pour and cold tests, are quite unnecessary for this purpose. Those which are useful are the distillation range (some writers prefer a measure of the volatility at ordinary temperatures), viscosity, and specific gravity (useful because it gives information as to composition, *e.g.*, more aromatics, higher S.G., and is very simple to measure) among physical properties ; and the unsulphonated residue or some equivalent test among chemical properties. If the material is a preparation which requires only dilution with water to be ready for use, it should be specified whether it is a " miscible oil," *i.e.*, plain solution of an emulsifier such as fatty acid soap or beta petroleum sulphonic acid soap, in the oil, or a " stock emulsion," *i.e.*, concentrated emulsion ; the emulsifying agent should be given.

The correlation between the physical and chemical properties of an oil and its biological performance is facilitated by distinguishing between winter washes (for the dormant and leafless plant) and summer washes (for the foliage-bearing plant).

With winter washes most workers have found insecticidal action not very dependent on physical properties. Above a certain minimum viscosity it is independent of this property and within wide limits is independent of boiling range. The unsulphonated residue should not be less than 60 per cent., *i.e.*, 60 per cent. of paraffin should be present. As this represents some degree of refinement, other chemical specifications are unnecessary. The type of emulsifier does not appear to influence the insecticidal activity, but the oil should be 100 per cent. " neutral oil " and free from alkali. Phytocidal activity may be neglected for winter washes, so that specific gravity, viscosity, boiling range and unsulphonated residue form a sufficient specification, together with oil content if it is a preparation capable of direct dilution with water.

With summer washes the phytocidal aspect is more important than the insecticidal. The latter, as for winter washes, is largely independent of physical properties over a wide range. There is no evidence that increased refinement diminishes the insecticidal potency. Phytocidal injury is of two types, (*a*) acute, in which leaf tissue perishes in a few days; this is attributable to chemical constituents; (*b*) chronic, appearing later and associated with metabolic changes possibly brought about by physical factors. Thus high viscosity may affect transpiration, reports having been made that apples are smaller on trees treated with heavy lubricating oil although it was devoid of constituents causing acute damage. This suggests that an upper limit to viscosity and boiling range should be specified. Acute phytocidal injury is acknowledged to be due to those constituents which are removed by sulphuric acid and the unsulphonated residue should definitely be fixed at a high figure—90 per cent is recommended. The author believes it unnecessary to give the iodine value, and the same four criteria are sufficient as for winter washes, with more precision in the ranges allowed. Since many users of sprays like to make a combined wash with some other insecticide, or fungicide, the manufacturer should state whether the emulsifier is such that it can be mixed with lead arsenate, lime-sulphur or Bordeaux mixture, etc.

For intermediate bud-burst washes some modifications are permissible and the unsulphonated residue may be fixed at a minimum of 80 per cent.

Tar Oils.—Tar oils differ from petroleum oils in the almost complete absence of paraffins and naphthenes and the presence of tar acids and tar bases. Industrial specifications usually give content of neutral hydrocarbons, tar acids and bases as well as specific gravity and boiling range.

Tar oils are less effective than petroleum oils against eggs of geometrids and capsids and to some extent against acarids, but more effective against eggs of aphids and psyllids. It is, therefore, supposed that they have a direct toxic action apart from their physical stifling action. Higher boiling fractions are more toxic, as with petroleum, and support the hypothesis that permanence of the film is the important factor.

The general conclusion of workers is that tar acids do not contribute very much to insecticidal power, are in fact less efficient than the neutral oils. The same applies to tar bases on which, however, less work has been done. The solid hydrocarbons of tar oils also seem to contribute little to the toxicity and are objectionable to the user.

Tar oils have considerable phytocidal action, as might be expected, both the aromatic hydrocarbons and the tar acids being active. Nevertheless some workers have reported no injury to young buds of gooseberry or currant with 10 per cent. tar acid content. Normally, however, tar oils are only used for winter washes, or their phytocidal properties are turned to account to combat mosses and lichens.

The different susceptibility of eggs to tar and petroleum oils makes it often advantageous to combine these oils in a dormant wash. It has become customary in fact to include a small proportion of high boiling petroleum oil in tar oil without disclosing it. An extra specification, the amount insoluble in dimethyl sulphate (in which aromatics are entirely soluble) is therefore desirable. For a simple tar oil it should be nil, but up to 10 per cent. is permissible in a marketed tar oil and more in a tar-petroleum preparation. A maximum figure should be allowed in

the specification coupled with a minimum figure for unsulphonated residue. In addition the specification should contain the neutral oil content, tar acid content (tar bases content is usually neglected) and content in solid matter as well as boiling range and specific gravity. Neutral oil content may be sacrificed (say from 88 per cent. minimum to 75 per cent. minimum) to tar acid content if the oil is only for use against aphid and psyllid eggs where specific toxic action comes into play. The type of emulsification in preparations ready for simple dilution should be specified, as with petroleum oil preparations.

In the next section the specifications are applied to a number of oils and oil preparations, both marketed products and experimental mixtures, with criticisms. The paper ends with a description of the analytical methods recommended and reasons for their recommendation. *D. R. P. Murray.*

REVIEWS AND NOTICES

GATER (B. A. R.) [King Edward VII College of Medicine, Singapore]. **Aids to the Identification of Anopheline Imagines in Malaya.**—242 pp. With 236 figs. & 9 plates. 1935. Singapore: Govt. Printing Office. [$1.]

The author, whose "Aids to the Identification of Anopheline Larvae in Malaya" was reviewed in this *Bulletin* [1934, Vol. 31, p. 755] some eighteen months ago, has completed his scheme by the publication of the present handbook, and in so doing has placed students of Oriental anophelines still further in his debt. As explained in the "Introduction," the arrangement is on practically the same lines as those followed in the former volume, and, for the avoidance of confusion, the nomenclature of species and subspecies is the same as that previously adopted. Material in the possession of the College of Medicine, Singapore, is still insufficient to warrant final conclusions as to the precise identity of all Malayan representatives of the genus *Anopheles*, but, once this impediment has been removed, it is hoped to issue a revised edition of both "Aids" in a single volume.

After a fairly detailed account of the external and internal anatomy of adult anophelines, the present instalment deals with "Life-History and Habits," and a series of practical matters such as "Collecting and Rearing," "Preserving and Mounting," and the making and utility of surveys, before, as in the volume devoted to larvae, providing a "Table for Rapid Identification," and "Brief Descriptions of Species."

Neglecting the primary subject of the identification of species, with which a reviewer, as such, is fortunately not called upon to deal, passing reference may be made to certain points of interest in the general body of the text.

The fact that trapping experiments have shown that some species of *Anopheles* are active throughout the night until dawn is held to be not without importance, "in view of the practice in many hospitals of removing the nets from patients' beds before it is light." In stating that anopheline eggs, after deposition, "arrange themselves in star-shaped patterns on the water," the author carries a generalization a little too far; the Mediterranean *A. multicolor*, for instance, lays its eggs horizontally side by side in "ribands"—a highly characteristic arrangement, which once seen cannot easily be forgotten. When discussing length of flight, GATER remarks that, in Malaya, "it is generally assumed that immunity from attack is secured beyond the half-mile limit." It has long been known, however, as was indeed proved years ago in Panama, that dwellings twice so far from an *Anopheles* breeding place may still be invaded, and certain members of the genus travel further than others. Indeed the author himself writes:—"Some species, notably *A. sundaicus*, are exceptionally powerful fliers up to a distance of six miles. The normal range for this species should, perhaps, always be estimated at two miles." Some work has already been done on the seasonal occurrence of *A. maculatus* and *A. minimus* in Malaya and the Far East, and the need of similar investigations in the case of all species of importance is emphasized.

In "Notes on Surveys," the author deprecates the placing of entire reliance on larval surveys, and stresses the importance of studying

imagines, adding that " it may be of great value to continue observations on them over the whole period during which anti-malaria works are in progress and for some time afterwards." He further observes that :—" The presence of males at one end of a town and not at the other is an indication that the breeding-places are in the direction where the proportion of males is greatest, and that the anopheline population of the town is being derived from that quarter." For the estimation of the daily output from breeding places, it may be necessary to determine the age of females, and the various means of doing this (ovarian index, state of the abdomen and of the wing-fringe) are described.

The " Table for Rapid Identification " (pp. 133–147) includes fifty-five species and subspecies, and those " recorded in the Malaysian subregion, but not yet from the Malay Peninsula," or unusually difficult to distinguish, are specially marked. The next eighty-three pages are devoted to brief illustrated descriptions in amplification of the Table, and the publication concludes with two Appendices, the first devoted to equipment and materials, the second consisting of lists of " Species Recorded from Neighbouring Countries (including the outlying islands)."

Well printed, arranged and illustrated, and (so far as the reviewer has been able to observe) entirely free from typographical errors, this handy and useful volume forms a worthy complement to its forerunner.

E. E. Austen.

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